



Oxford Policy Management

Development Innovation Fund – Health

Summative Evaluation Report

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Acknowledgments

This final summative evaluation report of the Development Innovation Fund – Health (DIF-H) was prepared by Luize Guimaraes, Frank Atherton, and Sam Franzen, under the leadership of Orvill Adams.

This evaluation was independently conducted. The information and views contained in this report are those of the authors and do not necessarily reflect the opinions of the IDRC or other DIF-H consortium members. Responsibility for the information and views expressed in this report lies entirely with the authors.

We would like to express our sincere thanks to, and appreciation of, the DIF-H consortium members with whom we met during the evaluation, and especially to Robert McLean for his assistance and guidance.

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Executive summary

Purpose of the evaluation

This report provides a summative evaluation of the Development Innovation Fund – Health (DIF-H). The primary user of this evaluation is the Government of Canada, which by Treasury Board decision, required that a retrospective assessment of DIF-H relevance and performance be conducted and presented to the Government of Canada after five years of program existence.

The Development Innovation Fund – Health

The Government of Canada established the DIF-H in 2008 when it pledged \$225 million over five years to support breakthrough research on critical global health problems with the aim of bringing lasting improvements to the health and lives of people in low-income countries (Government of Canada, 2008).

DIF-H's main objectives are

1. Identify and prioritize profound health challenges facing the developing world.
2. Mobilize scientific communities in Canada and the rest of the world, including the developing world, to address these health challenges through competitive selection and funding of projects.
3. Facilitate the affordable implementation and commercialization, in developing regions of the world, of solutions that emerge.

DIF-H is realized through the combined efforts of a consortium made up of the International Development Research Centre (IDRC), the Canadian Institutes of Health Research (CIHR), and Grand Challenges Canada (GCC). GCC is the implementing body, and is responsible for organizing grant calls and overseeing funded projects. CIHR is responsible for reviewing applications in response to GCC grant calls. IDRC is responsible for accountability to the Canadian government, disbursing funds to GCC, and managing evaluations and audits of DIF-H.

Methodology

A comprehensive evaluation approach was developed, inspired by contribution analysis (Mayne, 2009), an internationally accepted, theory-based methodology. The evaluation used a mixed-methods design drawing on multiple sources of data, such as program documents and project databases, academic and grey literature, interviews, focus group discussions, field-based case studies, and an online survey of both successful and unsuccessful applicants to DIF-H. A range of perspectives were considered from DIF-H consortium staff, GCC applicants and grantees, DIF-H stakeholders, and external experts. A framework analysis (NatCen Learning, 2012) approach was used to triangulate, cross-check, and analyze the results to ensure they were robust and sufficiently comprehensive.

A draft of this report was reviewed by all members of the consortium, an external oversight committee, and an independent reviewer contracted by Oxford Policy Management.

Findings

Evidence was assessed with reference to the requirements of the Treasury Board of Canada Secretariat. Five core issues were considered, following the Policy on Evaluation (Centre of Excellence for Evaluation, 2009), to assess whether the program has demonstrated value for money as a Canadian public investment. The Treasury Board of Canada defines value for money as the degree to which a program demonstrates relevance and performance (Centre of Excellence for Evaluation, 2013).

Relevance

Continued need for the program

Global health continues to be a priority in international development and is highlighted in the Sustainable Development Goals (SDGs) as needing further investment. DIF-H addresses demonstrable needs for Canada, as well as the international community, and in so doing provides a significant contribution to several SDGs (2, 3, 6, 9, and 17). There is a continuing need for financing to support innovations while resolving barriers to global health and safety, and promoting development and equity in low- and middle-income countries (LMICs). Innovation is recognized as a relevant and cost-effective way to address health challenges in LMICs. DIF-H has increased the opportunities for Canadian researchers and innovators to engage with LMIC innovators and research institutions. This work, supported by DIF-H, has contributed to positioning Canada at the forefront of international efforts to rethink development modalities.

The Canadian public recognizes the importance of this national support for development and global health, both from a humanitarian perspective and in terms of reducing the potential dangers of global health risks, and appreciates the value it adds to Canada's international reputation.

Alignment with government priorities

Global health is a priority for Canadian official development assistance (ODA), and within that, maternal, newborn, and child health is a key priority. DIF-H is aligned with the Department of Foreign Affairs, Trade and Development's Report on Plans and Priorities.

DIF-H is also broadly aligned with other Canadian government sectors, such as industry and trade and the renewed science and technology strategy (Government of Canada, 2015).

DIF-H supports projects in 54 countries, many of which are classed as priorities for Canadian ODA. DIF-H aims to expand relevant innovations developed in these countries to benefit more ODA priority countries.

Alignment with federal roles and responsibilities

Innovation must be based on good science, yet be adaptive and responsive to local needs. Good management is essential in balancing the risks inherent in investing in innovation. By leveraging the expertise of all consortium members, DIF-H addresses all these issues and, therefore, the consortium mechanism is well suited to managing an innovation fund and providing a funding delivery vehicle.

In the absence of any suitable independent not-for profit organization, the decision to create GCC as a new organization within the consortium was also appropriate, and still remains valid.

DIF-H offers a valuable contribution to Canada's diplomatic agenda and GCC has established an impressive set of formal and informal international partnerships and networks. However, DIF-H lacks a clear strategic vision for coordinating with, and working alongside, the wider governmental aid effort.

Performance

Achievement of expected outcomes

Ultimate outcomes have been achieved. DIF-H-funded projects have saved and improved lives through innovative interventions. This evaluation estimates that in the region of 8,689 lives have been saved (range: 209 to 16,415) and 160,000 lives improved (range: 136,905 to 252,452).

Intermediate outcomes have been achieved. Around 3.69 million people in developing countries (range: 3.69 million to 5.28 million) now have access to innovative health products and services developed through DIF-H funding. Projects funded by DIF-H have had a positive impact on health policies, training practices, and health systems, improving the lives of end-users.

Immediate outcomes have been achieved. Around 7,600 jobs and funding opportunities in addressing global health through innovation have been created both in Canada (estimated 578) and in LMICs (estimated 7,018). An estimated 78% of DIF-H-funded projects were specifically developed in response to GCC grant calls, supporting the idea that DIF-H is addressing a market gap and, indeed, creating new opportunities, rather than funding adapted or repurposed projects.

As current investments mature, further beneficial outcomes are expected.

GCC has successfully promoted organizational and project partnerships, building networks and developing capacity in supporting health innovation projects. It has also leveraged and secured venture capital funding in excess of the original DIF-H investment.

These activities have contributed to increased knowledge and awareness of a positive international Canadian brand related to global health innovation. Plans to further promote the Canadian government's involvement in DIF-H will further boost Canada's reputation.

Outputs have been produced. According to the most recent data available (GCC Annual Report 2013–2014), 346 innovations have been developed, including prototypes, service delivery models, and models developed through economic modelling. Grantees have published results in peer-reviewed papers and have secured patents for innovations.

In addition, there is a high success rate in expanding the development of small-scale projects. Caution is needed in interpreting this result; it may suggest a conservative approach to funding advanced projects with little risk. A more risk-tolerant approach could see the funding of even more innovative projects that offer a fresh and novel perspective.

These are significant accomplishments for a research and innovation program that has only been operational for five years. It is our independent assessment that the Government of Canada (by action of IDRC, CIHR, and GCC) has demonstrated international leadership in the use of science and human creativity to improve the health of those who need it most.

Still, GCC monitoring of projects and reporting of results requires improvement. These findings represent a triangulation of the best available evidence from multiple GCC documents, and primary

data independently collected by the evaluators. More precise and reliable presentation of results was not possible due to deficiencies and limitations of the GCC monitoring and reporting system.

These limitations result from attempting to develop a monitoring and reporting system that requires minimal effort, can be easily used by grantees, and requires little technical expertise to interpret reports. The system is not sufficiently systematic, and indicators need to be strengthened. In addition, GCC's reporting of results requires greater attention to scientific rigour, transparency, and consistency. The current approach damages the credibility of claims by allowing skepticism of genuine results.

GCC has improved this system since the formative evaluation, but further work is still needed.

Demonstration of efficiency and economy

DIF-H has been an efficient investment for the Government of Canada, in terms of both the results achieved in relation to resources utilized (allocative efficiency) and the processes that have translated inputs into outputs (operational efficiency).

The evaluation found that the establishment and implementation of DIF-H was economical, with minimization of procurement costs, mechanisms to leverage technical support through networking, and restricting inputs to only those that were needed. However, some of the DIF-H economies may not actually be net savings for the Government of Canada, because the services provided by CIHR and IDRC have been undervalued. The exact funding shortfall incurred by these organizations due to insufficient funding allocation is not known because resource outputs assigned to DIF-H were not tracked.

The allocative efficiency of DIF-H is acceptable, especially since more results from current investments will be achieved in the future. The findings of this evaluation provide benchmark data for future assessments of the DIF-H or similar programs.

The operational efficiency of DIF-H is good, but there is room for improvement. DIF-H and GCC compare well to international benchmarks, but it appears that GCC underinvests in its own operations. Efficiency could be increased, for example, by hiring more specialist staff to improve the rigour of monitoring and evaluation. While DIF-H's management and reviewing practices are good, internal knowledge transfer throughout the consortium has at times been inefficient.

All DIF-H consortium members performed their specified roles proficiently. DIF-H is adequately directed by the GCC board, which includes representatives from IDRC and CIHR. However, current governance mechanisms do not provide the Government of Canada with a system to proactively steer DIF-H activities, which renders the government vulnerable to risks that it has no ability to mitigate.

The evaluators note that there has been limited scientific input throughout project life cycles and in relation to recent DIF-H management decisions. This means that opportunities to guide program developments scientifically have been missed and the scientific rigour of projects cannot be guaranteed.

Conclusions and recommendations

The Government of Canada's investment in DIF-H has provided value for money. Investing in DIF-H remains relevant, and DIF-H has produced significant results. These outcomes have been produced economically, with acceptable levels of allocative efficiency and good

levels of operational efficiency. Still, this evaluation has uncovered several issues that require attention.

If further investment is allocated to DIF-H in its current form, a key consideration will be determining the extent to which the Government of Canada wishes to steer the strategic direction of these funds. As the financing of GCC by external sources increases and its accountabilities diversify, the Canadian government's stewardship influence will be weakened. However, increasing government control risks undermining the purposes for which GCC was created: independence, flexibility, and responsiveness.

Regardless of the future form that DIF-H takes, the following recommendations are presented to improve program relevance and performance.

Recommendation 1: Better strategy. DIF-H should develop an applied and dynamic, consortia-level strategy for outlining coordination with Canadian aid and other governmental initiatives in global health and development. A DIF-H strategy should also formalize expected visibility arrangements and improve internal knowledge transfer and cooperation between consortium members. The same is recommended of any DIF endeavour into other fields of innovation (e.g., environment, agriculture, education, etc.).

Recommendation 2: Strengthen scientific oversight. Although CIHR peer review ensures that funded projects are scientifically rigorous at their earliest stages, there are few mechanisms to ensure that scientific standards of projects are maintained post-implementation. Mechanisms should be put in place to guarantee the scientific integrity of funded projects throughout their life cycle. While the Scientific Advisory Board does review the outcomes of the top performing projects, it is afforded insufficient time and data, and it lacks sufficient resources and mandate to do this for all projects. Therefore a more systematic, but efficient, mechanism is needed. GCC's formation of specialist platforms to support the targeted challenge and Transition to Scale grand challenges is a step in the right direction, but GCC should pay greater attention to the Stars projects.

The decision that the Scientific Advisory Board should work through subcommittees has resulted in reduced scientific leadership and input. Accordingly, opportunities were missed for engagement with the strategic direction of GCC and DIF-H (as opposed to the operational work of the individual grand challenges). DIF-H must consider these implications and work to ensure that management decisions continue to be supported by expert scientific thinking.

Recommendation 3: Optimize metrics. The results indicators used by GCC require further refinement to make them more precise and objective. Adopting international measures of efficacy that better reflect age-weighted health gains would also enable international comparisons of efficiency. The evaluators appreciate that there are advantages and limitations of different measurement methodologies, but the use of common metrics and benchmarks could help facilitate reporting, and form the basis for target setting.

Recommendation 4: More rigorous monitoring and reporting. GCC should undertake a comprehensive review of its monitoring and reporting arrangements. These need to be more systematic, transparent, and consistent, so as to balance the externally facing promotional approach with the need for scientific rigour. To ensure credibility, there should be an audit trail connecting raw data to final results claims.

Recommendation 5: Seize efficiency opportunities. GCC is an efficient organization. However, further operational investment would increase efficiency to a greater extent and avoid the risk of underperformance. Although this represents a trade-off with cost minimization, investment in areas

such as more comprehensive monitoring and additional specialist staff could improve results and reporting that will balance the allocative efficiency ratio of inputs to outcomes—in simpler terms, doing more with more.

DIF-H should review the funds allocated to IDRC and CIHR to ensure that they cover the actual costs incurred in providing services to DIF-H. This allocation should be based on an estimation of previous resource use. Future resources provided to DIF-H should be tracked to prevent under- or over-allocations.

Management response and action plan

Overall, members of the Development Innovation Fund – Health (DIF-H) consortia are satisfied with the structure, content, conclusions and recommendations of the Summative Evaluation of DIF-H.

The IDRC endorses the quality of this evaluation report. The report meets, and in particular areas exceeds, accepted standards of: utility, feasibility, propriety, and accuracy. The DIF-H consortium concurs and has taken advantage of multiple opportunities to inform, question, and support the external evaluator. At the same time, concrete and robust steps have ensured absolute independence of the evaluation process and result.

Consortium members agree with the evaluators conclusion that DIF-H is a relevant investment for the Government of Canada, and that it has met all of its objectives in terms of results achieved in relation to inputs. More specifically that:

- DIF-H addresses demonstrable needs for the international community, Canadian innovators, and the public;
- DIF-H is well aligned with the Government of Canada’s thematic priorities in global health development and innovation;
- The consortium mechanism for DIF-H is relevant for the management of an innovation fund;
- Reasonable expectation of all ultimate, intermediate and immediate outcomes and outputs has been achieved by DIF-H;
- An acceptable level of economy was achieved by DIF-H. Allocative efficiency is acceptable, especially since more results from current DIF-H investments will be achieved in the future, and operational efficiency is also good; and
- Each DIF-H consortium member has performed its specified roles proficiently and as required.

The evaluation’s recommendations focus on refinements going forward. In particular, the need for strategic leadership and governance of the consortium, and on continuing improvements in performance. We detail our response to each recommendation, in turn, below.

Recommendation 1: Better strategy. *DIF-H should develop an applied and dynamic, consortium-level strategy for outlining coordination with Canadian aid and other governmental initiatives in global health and development. A DIF-H strategy should also formalize expected visibility arrangements and improve internal knowledge transfer and cooperation between consortium members. The same is recommended of any DIF endeavour into other fields of innovation (e.g., environment, agriculture, education, etc.).*

Management Response: Consortium members agree with the recommendation, and note some further but important considerations.

While the Government of Canada did not specifically empower any consortium member, or any governance body, to provide strategic leadership for DIF-H per se, the Memorandum of Understanding between the consortium members recognizes IDRC’s stewardship role, and the Grant Agreement between IDRC and GCC stipulates that IDRC is the steward of DIF-H funds for the Government of Canada.

Consortium members recognize that the Board of GCC has provided able strategic guidance over GCC's operations and strategy, in that organization's role as the primary delivery vehicle for the Initiative. IDRC's and CIHR's governance structures have done the same, where necessary, in relation to their respective roles in DIF-H. In the context of the GCC Board, the Presidents of both IDRC and CIHR have capably fulfilled their fiduciary responsibilities to GCC.

Action Plan: While keeping in mind that GCC has served as an alternative service delivery mechanism, consortium members recognize that the GCC Board's strategic guidance and GCC strategies are not intended to be substitutes for DIF-H strategies or governance, or integration of strategies and activities of each of the consortium members – and this is a matter that the Government may wish to consider, particularly going forward, with reference to any other DIF endeavours (in health or alternative fields).

Recommendation 2: Strengthen scientific oversight. *Although CIHR peer review ensures that funded projects are scientifically rigorous at their earliest stages, there are few mechanisms to ensure that scientific standards of projects are maintained post-implementation. Mechanisms should be put in place to guarantee the scientific integrity of funded projects throughout their life-cycle. While the Scientific Advisory Board does review the outcomes of the top performing projects, they are afforded insufficient time and data, and they lack sufficient resources and mandate to do this for all projects. Therefore a more systematic, but efficient mechanism is needed. GCC's formation of specialist platforms to support the Targeted Challenge and Transition to Scale grand challenges are a step in the right direction, but GCC should pay greater attention to the Stars projects.*

The decision that the Scientific Advisory Board should work through sub-committees has resulted in reduced scientific leadership and input. Accordingly, opportunities were missed for engagement with the strategic direction of GCC and DIF-H (as opposed to the operational work of the individual grand challenges). DIF-H must consider these implications and work to ensure that management decisions continue to be supported by expert scientific thinking.

Management Response: Consortium members agree with this recommendation.

Action Plan: GCC's management will develop a plan to strengthen scientific integrity throughout the life-cycles of GCC's projects. This plan will include re-implementation of a full Scientific Advisory Board to meet regularly and to play an ultimate scientific advisory role. The plan will also elaborate on how the successes of the specialist platforms will be leveraged going forward.

This plan is expected to be deliberated by GCC's Board before March 2016. In the meantime, GCC management will review and report on existing project management to ensure continued scientific integrity.

Recommendation 3: Optimise metrics. *The results indicators used by GCC require further refinement to make them more precise and objective. Adopting international measures of efficacy which better reflect age-weighted health gains would also enable international comparisons of efficiency. The evaluators appreciate that there are advantages and limitations of different measurement methodologies, but the use of common metrics and benchmarks could help facilitate reporting, and form the basis for target setting.*

Management Response: Consortium members agree with this recommendation.

Action Plan: In regular monitoring discussions pursuant to their Grant Agreement, IDRC has requested GCC management to review and report on comparators indicators and metrics to ensure that, to the extent possible, GCC results can be benchmarked internationally. This review should be complete no later than March 2016 and should be shared with the full GCC Scientific Advisory Board and, with their inputs and review recommendations, deliberated by GCC's Board by no later than June 2016.

Recommendation 4: More rigorous monitoring and reporting. *GCC should undertake a comprehensive review of its monitoring and reporting arrangements. These need to be more systematic, transparent and consistent, so as to balance the externally facing promotional approach with the need for scientific rigor. To ensure credibility, there should be an audit trail connecting raw data to final results claims.*

Management Response: Consortium members agree with this recommendation.

Action Plan: In regular monitoring discussions pursuant to their Grant Agreement, IDRC has requested GCC management to undertake this review, with urgency, with a view to standardizing a single project monitoring and reporting database that underpins all GCC reporting, while removing any other parallel databases by March 2016. CIHR and IDRC have also recommended that GCC consider commissioning, following the present funding phase for DIF-H, an independent evaluation of reported results, something not possible under the tight timeframes of this summative assessment.

Recommendation 5: Seize efficiency opportunities. *GCC is an efficient organization. However, further operational investment would increase efficiency to a greater extent and avoid the risk of under-performance. Although this represents a trade-off with cost minimization, investment in areas such as more comprehensive monitoring and additional specialist staff could improve results and reporting that will balance the allocative efficiency ratio of inputs to outcomes. In simpler terms, doing more with more.*

DIF-H should review the funds allocated to IDRC and CIHR to ensure that they cover the actual costs incurred in providing services to DIF-H. This allocation should be based on an estimation of previous resource use. Future resources provided to DIF-H should be tracked to prevent under- or over-allocations.

Management Response: Consortium members agree with this recommendation.

Action Plan: In tandem with GCC reviews of benchmarking and of monitoring and reporting, IDRC has requested GCC management to develop a human resources plan to address these efficiencies. This would be presented to the GCC Board for deliberation by June 2016. IDRC has also requested CIHR to provide an estimate of actual costs incurred in providing scientific reviews of GCC calls, while IDRC will provide an estimate of the costs of IDRC participation in the consortium; such estimates to be developed by March 2016 as inputs to any Government of Canada decision making around strategic directions of DIF-H and DIF endeavours more broadly.

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List of abbreviations

C\$	Canadian dollar
CIHR	Canadian Institutes of Health Research
DALY	Disability-adjusted life years
Diagnostics	Point-of-Care Diagnostics – Grand Challenge
DIF-H	Development Innovation Fund – Health
DFATD	Department of Foreign Affairs, Trade and Development
DFID	Department for International Development (United Kingdom)
Explorations	Grand Challenges Explorations – Grand Challenge
GCC	Grand Challenges Canada
HIC	High-income country
IDRC	International Development Research Centre
LMEF	Learning Monitoring and Evaluation Framework
LMIC	Low-and middle-income country
ODA	Official development assistance
OECD-DAC	Organisation for Economic Co-operation and Development – Development Assistance Committee
OPM	Oxford Policy Management
QALY	Quality-adjusted life years
SLAB	Saving Lives at Birth – Grand Challenge
Stars	Stars in Global Health – Grand Challenge
TTS	Transition to Scale – Grand Challenge
USAID	United States Agency for International Development
WHO	World Health Organization

Evaluation objectives

Building on the formative evaluation conducted in 2011, this reports presents a summative evaluation of the Development Innovation Fund – Health (DIF-H). Covering the period 2008 to 2015, this evaluation determines the extent to which DIF-H is a relevant investment for the Government of Canada, and whether it has met its objectives.

The *primary user* of this evaluation is the Government of Canada, as the principal funder of DIF-H. The evaluation will be used as part of the Government of Canada’s commitment to accountability for results and assessing program effectiveness. *Secondary users* of the evaluation are Grand Challenges Canada (GCC), the International Development Research Centre (IDRC), and the Canadian Institutes of Health Research (CIHR), as the members of the DIF-H consortium. These organizations will use evidence derived from the evaluation to make organization level decisions about DIF-H programming. *Tertiary users* of the evaluation include the global health research community, the innovation community, and Canadians at large. All of these parties may hold interest in evaluation results for reasons of furthering a shared understanding of innovative research funding approaches or for accountability reasons.

Evaluation management

Responsibility for the management of the evaluation of the DIF-H was directed to the IDRC by the Treasury Board Secretariat of Canada (TBS) through Memorandum to Cabinet. The evaluation that follows upholds the highest principles of quality and independence. For further detail, Annex A comprehensively outlines the evaluation management procedure.

Under the management of IDRC, an external and independent evaluator was commissioned to conduct this evaluation. A team from Oxford Policy Management — an Oxford, England, based consulting firm — was selected through a competitive process, based on requirements of expertise, knowledge, and experience that were set and agreed upon by the DIF-H consortium.

An oversight structure was developed to assist the IDRC Evaluation Office in its evaluation management role. This oversight structure ensured a transparent and collaborative, yet independent, process of review. The structure comprised two discrete committees:

1. **The DIF-H Evaluation Committee** was charged with **thorough discussion** of issues pertinent to the evaluation. It was convened by the Evaluation Office of the IDRC and was composed of senior level representatives of each consortium member — IDRC, GCC, and CIHR.

2. **The DIF-H External Oversight Committee** was charged with **approval** of three issues: 1) selection of the evaluator; 2) evaluation design; and 3) the final evaluation report. The committee was convened by the Evaluation Office of the IDRC, and chaired by the head of Evaluation at IDRC (as a non-voting member). The Committee comprised three external subject area experts who are fully independent of each consortium member:
 - François Dumaine, LLL, MA, CE — Partner at PRA Inc.; Past President of the Canadian Evaluation Society;
 - Kathryn Graham, Ph.D. — Executive Director Performance Management and Evaluation, Alberta Innovates – Health Solutions;
 - Kathryn Wehr, MPH — Program Officer, Robert Wood Johnson Foundation.

Upon completion, this report was externally peer-reviewed for quality assurance by Dr. Charles Lusthaus, co-founder of the international development and evaluation consulting firm Universalia, and retired professor at McGill University, Montréal.

DIF-H program profile

Rationale for Development Innovation Fund – Health

In 2008, the Government of Canada established the Development Innovation Fund – Health (DIF-H), pledging \$225 million over five years to support breakthrough research that addresses critical global health problems to bring lasting improvements to the health and lives of people in low-income countries (Government of Canada, 2008).¹

DIF-H is managed by a consortium of three organizations: the International Development Research Centre (IDRC), the Canadian Institutes of Health Research (CIHR), and Grand Challenges Canada (GCC). Their roles and responsibilities are presented below.

On May 3, 2010, the Honourable Jim Flaherty announced the launch of Grand Challenges Canada. GCC was launched in 2010 and has developed programs for researchers from Canada and low- and middle-income countries (LMICs) targeted in different areas, including Point-of-Care Diagnostics, Women’s and Children’s Health, Global Mental Health, and Hypertension. In addition, the Stars in Global Health program supports research on “innovator-defined” global health challenges. Many of these programs have been undertaken in partnership with other institutions, in addition to CIHR and IDRC, including the Bill and Melinda Gates Foundation, the United States Agency for International Development, and the United Kingdom’s Department for International Development, among others.

DIF-H is therefore a fund, a consortium, and a delivery mechanism.

As described in the terms of reference (IDRC, 2015) the purpose of this summative evaluation is to “...determine the extent to which DIF-H is succeeding. However since the ultimate results for DIF-H are not expected within the summative evaluation timeline, the evaluation will need to determine what has been accomplished to date in terms of results and what can be said about the likelihood of future expected results.”

DIF-H objectives

The Government of Canada indicated that the Development Innovation Fund could eventually become a multi-sectoral support fund, but that the initial focus was to be on global health. It was therefore named the Development Innovation Fund – Health.

DIF-H’s mission is threefold (IDRC, 2015):

1. Identify and prioritize profound health challenges facing the developing world.
2. Mobilize scientific communities in Canada and the rest of the world, including in the developing world, to address these health challenges through competitive selection and funding of projects.
3. Facilitate the affordable implementation and commercialization, in developing regions of the world, of solutions that emerge.

¹ This budget plan was tabled in the House of Commons by the Honourable Jim M. Flaherty, P.C., M.P., Minister of Finance.

The logic for DIF-H and the expected pathways to achieving these objectives are presented in the DIF-H theory of change (Sridharan *et al.*, 2011) (see Figure 1).

The DIF-H consortium

The DIF-H was designed as a consortium of three organizations, namely, the International Development Research Centre (IDRC), the Canadian Institutes of Health Research (CIHR), and Grand Challenges Canada (GCC). Each organization's specific roles and responsibilities were established by the Treasury Board decision that initiated DIF-H. A memorandum of understanding between IDRC, CIHR, and GCC specified the funding relationship between the three organizations.

IDRC is responsible to the Government of Canada for the ultimate oversight of the DIF-H. IDRC delivers its DIF-H-related responsibilities through: 1) the operational support it provides to GCC, mainly relating to institutional set-up; 2) ensuring the accountability of DIF-H to the government; and 3) managing the formative and summative evaluations and audits of DIF-H.

CIHR is responsible for peer-reviewing applications in response to GCC grant calls, which are funded by DIF-H. The DIF-H grant award system is administered by CIHR in accordance with international standards of excellence.

GCC is a purpose-built not-for-profit organization created to be the DIF-H implementation arm. Therefore, while IDRC is responsible for oversight of DIF-H, GCC is responsible for the projects that are funded by DIF-H and, therefore, the delivery of the identified policy priorities and the monitoring and evaluation of funded projects. GCC delivers its DIF-H mandate by funding innovators in the field of global health, with a focus on innovators from LMICs. Grants and zero interest loans are awarded through a challenge fund mechanism that currently has three main windows:

1. **Targeted challenges** that fund innovators to work on specific global health issues. The targeted challenges are maternal, newborn, and child health (Saving Lives at Birth — SLAB) implemented in collaboration with key partners such as the United States Agency for International Development (USAID), early childhood development (Saving Brains), and mental health (Global Mental Health). During the first two years of GCC's existence (2009–2010) there were also targeted challenges focused on Point-of-Care Diagnostics (Diagnostics) and Hypertension.
2. **Challenges to fund innovators in global health with no pre-identified theme.** This program, initially called Rising Stars, is now known as Stars in Global Health (Stars).
3. **Challenges to enable promising innovations to transition to scale** (GCC, no date).² This has been known as Bridge Funding, Direct Entry, and Transition to Scale and is now called Transition to Scale (TTS). Transition to Scale spans across the targeted challenges and Stars in Global Health programs.

A conceptual diagram of the DIF-H consortium and its responsibilities is presented in Figure 2 below.

² Provided by GCC as part of the material for the summative evaluation.

Figure 1: The DIF-H theory of change

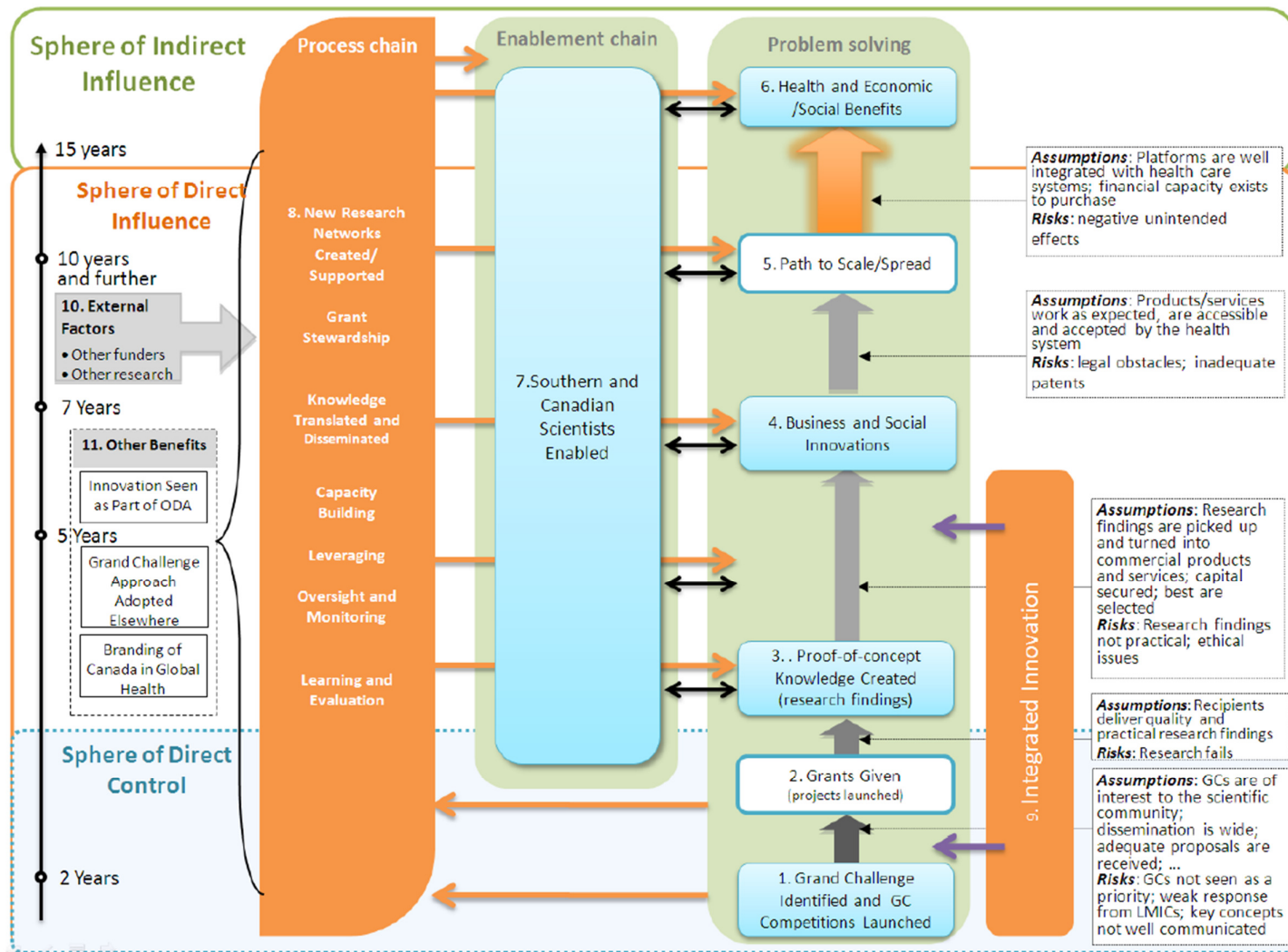
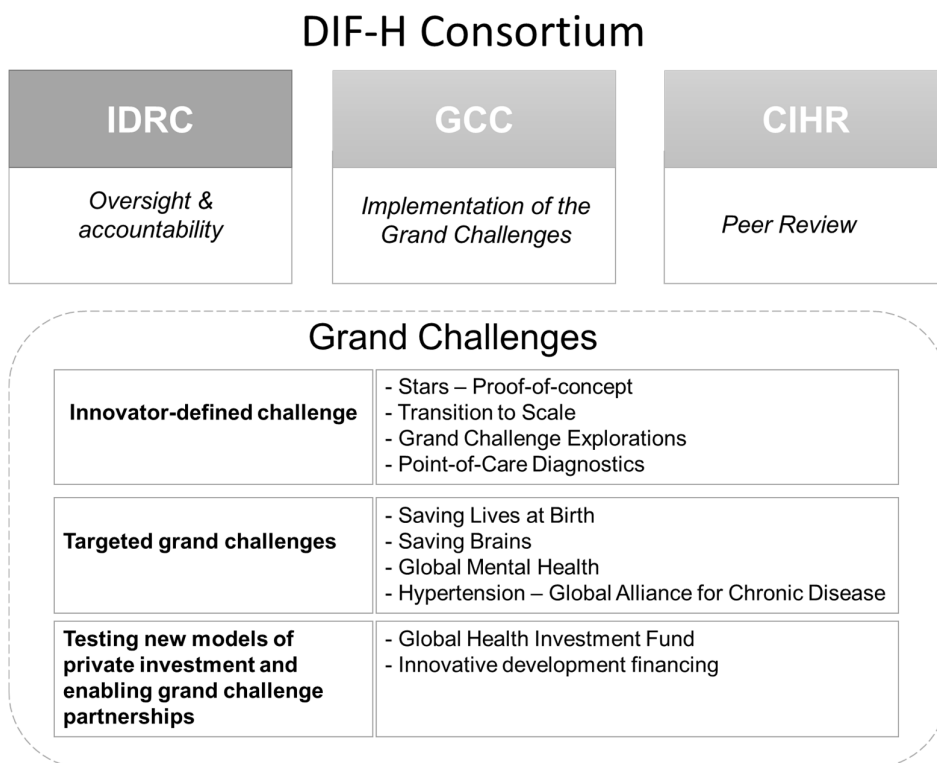


Figure 2: Conceptual diagram of the DIF-H consortium and its responsibilities

DIF-H activities

Table 1 summarizes the number of requests for proposals implemented and application statistics for each grand challenge. Table 2 shows the allotment of DIF-H budget by consortium member. Table 3 outlines DIF-H financial outlays by GCC.

Table 1: Requests for proposals and application statistics for each grand challenge

	Stars	TTS	Saving Brains	SLAB	Global Mental Health	Diagnostics
No. of rounds of requests for proposals	7	Rolling application	5	4	3	1
Total no. of applications received	2,692	63	342	2,101	206	205
Total no. of applications selected	480	41	48	65	42	12
% success rate	18%	65%	14%	3%	20%	6%

Source: Grand Challenges Canada (2015). Application Statistics. April 2015

Table 2: DIF-H budget allotment by consortium member

Consortium member	Allotment of DIF-H budget
IDRC	4,500,000
CIHR	900,000
GCC	165,012,690

Source: IDRC data

Table 3: DIF-H financial outlays by GCC (to date)

	Grand challenge program	No. of projects	DIF-H		Funding leveraged to date	
			Commitments (C\$)	Expensed (C\$)	Project level co-funding	Program level co-funding
Innovator-defined challenges	Stars - Proof-of-Concept	471	50,840,661	50,432,726	23,269,743	
	Transition to Scale	31	13,740,069	6,107,666	36,162,151	
	Grand Challenges Explorations	6	2,460,781	2,413,147	3,390,842	
	Point-of-Care Diagnostics	12	12,518,255	11,414,715	16,962,155	36,798,033
	Total	520	79,559,766	70,368,254	79,784,891	36,798,033
Targeted grand challenges	Saving Lives at Birth	25	7,739,390	6,180,940	1,489,165	42,819,858
	Saving Brains	52	31,309,929	24,023,184	5,761,130	900,000
	Global Mental Health	51	28,232,030	21,590,321	1,297,946	-
	Hypertension — Global Alliance for Chronic Diseases	6	2,277,835	1,073,288	-	4,006,638
	Total	134	69,559,184	52,867,733	8,548,241	47,726,496
Testing new models of private investment and enabling grand challenge partnerships	Impact Investment Funds (Global Health Investment Fund)	1	9,781,827	9,781,827	-	96,368,300
	Innovative Development Financing	-	-	-	-	-
	Total	1	9,781,827	9,781,827	-	96,368,300
Research support activities	Total — Research Support Activities	-	6,111,913	6,111,913	-	-

Source: GCC figures: Strategy Roadmap, March 2015; IDRC and CIHR figures: DIF-H budget allocation, 2008

Methods

The methodology for the summative evaluation of DIF-H was comprehensively presented in the evaluation design report developed in March 2015. Prior to being implemented, the evaluation design was reviewed and approved by all DIF-H consortium members, and by the evaluation's External Oversight Committee.

Structure of the evaluation

In keeping with the requirements of the Treasury Board, this evaluation was structured by reference to the core issues for evaluations of federal programs presented in the Policy on Evaluation (TBS, 2009). These core issues assess the **value for money** of federal investments. This refers to the extent to which programs demonstrate **relevance** and **performance**.

Relevance is demonstrated by the extent to which a program responds to Core Issues 1, 2, and 3, namely:

1. **Continued need for the program:** Assessment of the extent to which the program continues to address a demonstrable need and is responsive to the needs of Canadians;
2. **Alignment with government priorities:** Assessment of the linkages among program objectives and federal government priorities;
3. **Alignment with federal roles and responsibilities:** Assessment of the role and responsibilities of the federal government in delivering the program.

Performance is demonstrated by the extent to which the program responds to Core Issues 4 and 5, namely:

4. **Achievement of expected outcomes:** Assessment of progress toward expected outcomes (including immediate, intermediate, and ultimate outcomes);
5. **Demonstration of efficiency and economy:** Assessment of resource utilization in relation to the production of outputs and progress toward expected outcomes.

To achieve a rigorous evaluation according to these criteria, the evaluators developed a comprehensive evaluation matrix based on these core issues. The evaluation matrix presents the key evaluation questions for each core issue and the indicators that were used to assess DIF-H, as well as the data sources and methods that were used to collect evidence on the indicators. This evaluation matrix is presented in Annex B.

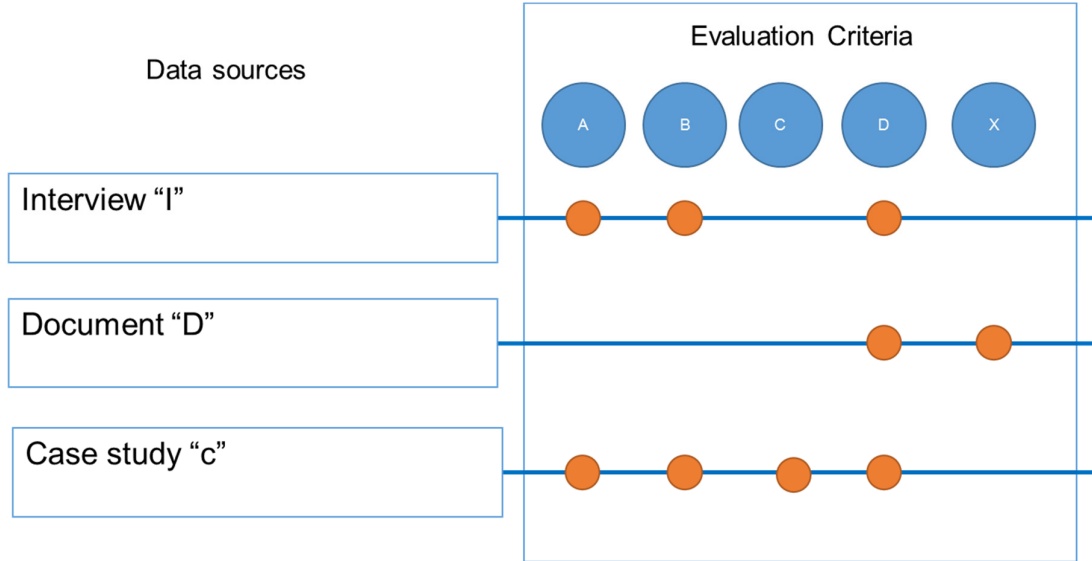
Methodological approach

The selected methodology was inspired by contribution analysis. This theory-based evaluation methodology can enable robust conclusions and credible assessments of cause and effect, even for complex interventions. Furthermore, this method supports the in-depth assessment of outcomes by explicitly incorporating the DIF-H theory of change into the evaluation. Our approach to contribution analysis was guided by the methodology set out by John Mayne (Mayne, 2008; 2009). The methodology was approved by the External Oversight Committee.

Data collection

Mixed methods were used to triangulate and cross-check findings between DIF-H reports and independently collected primary data. A conceptual diagram demonstrating triangulation is shown in Figure 3.

Figure 3: A conceptual representation of sampling for data triangulation



Source: Adapted from Toulemonde and Delahais (2014)

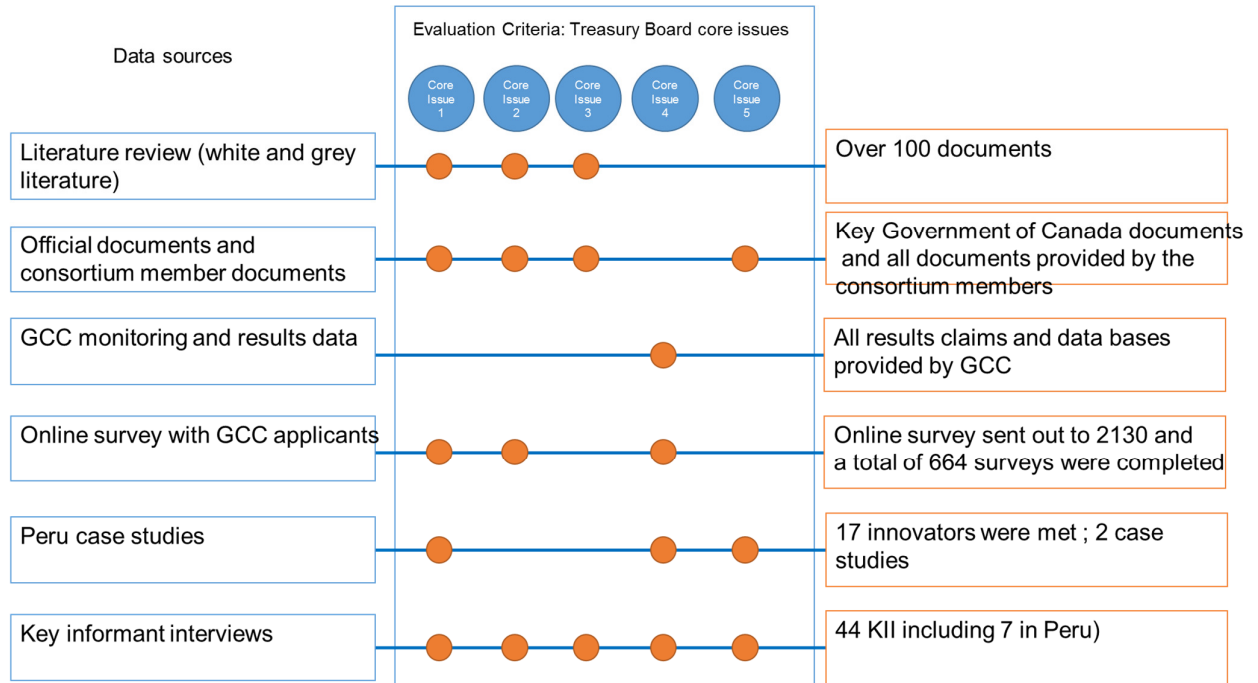
Secondary data on DIF-H inputs, activities, outcomes, and their relevance were captured by reviewing program documents and wider white and grey literature. Aggregated results claims in GCC documents were then validated by cross-checking them against a disaggregated project database.

Independently collected primary data were captured by conducting interviews and focus groups with DIF-H staff, stakeholders, and external experts. To assess if the findings from interviews and focus groups were representative of the experience of grantees implementing projects, field-based case studies were conducted in Peru. These consisted of interviews and focus groups with grantees and local stakeholders, and observations of project activities.

To determine if the findings presented in the case studies and DIF-H documents were representative of DIF-H beneficiaries' experiences, an online survey was administered to DIF-H applicants and grantees.

A summary of the data collection exercises and the evidence they contributed to each core issue is presented in Figure 4. The full list of data sources used in this evaluation are described in Annex C, and the resultant data they contributed to the evaluation are summarized in the evaluation matrix (Annex B). Summaries of the two project case studies in Peru are presented in Annex D and E. Names and details of respondents are not provided in order to protect confidentiality and anonymity.

Figure 4: Summary of data collection exercises and the evidence they contribute to each core issue



Report of the Expert Review Panel on Grand Challenges Canada

In addition to the evaluation activities undertaken by the evaluation team, the board of directors of Grand Challenges Canada commissioned separately an international Expert Review Panel to review GCC’s impact and outcomes over its first five years of operations, and to provide recommendations for its future direction.

According to the draft report of the Expert Review Panel on GCC, “the panel met several times via teleconference and at an in-person retreat in Toronto, Ontario, in July 2015. Members were briefed by management and staff from Grand Challenges Canada about its programs and activities, reviewed a number of documents and reports, and conducted a number of in-person and group interviews with Grand Challenges Canada’s innovators and other stakeholders” (Morin, 2015).

The summative evaluation of DIF-H contained in this report was an independent process from that conducted by the Expert Review Panel. However, it was requested that the evaluation team have some interaction with the Expert Review Panel and consider its findings as another data source, where appropriate. To this end, the evaluation team leader spoke with Marie-Lucie Morin, the chair of the Expert Review Panel, and the evaluators were provided with a preliminary draft report of the Expert Review Panel’s findings.

The evaluators note that the Expert Review Panel has brought a great deal of expertise to bear and produced a well-considered report, particularly regarding international thinking on the relevance of GCC. However, it should be understood that the Expert Panel Review was a discrete process from the summative evaluation and therefore the evaluators cannot comment on its validity, nor endorse it.

Analysis

Data were analyzed using a framework analysis approach (NatGen Learning, 2012). This involved summarizing and condensing the most important information that arose from the data collection activities, and inserting the summaries into a framework that linked the evidence, and the source it came from, to each question in the evaluation matrix. This evidence was then regularly reviewed to assess if it was sufficiently comprehensive to draw robust conclusions.

Reporting

Emerging evaluation findings were presented to the DIF-H consortium senior management during an in-person meeting in Ottawa. DIF-H consortium members then commented on these findings, which were incorporated into a draft final evaluation report. This draft report was reviewed by each consortium member, followed by an external review organized by IDRC, and was subsequently approved by the External Oversight Committee. This final draft reflects the conclusive views of the independent evaluator, Oxford Policy Management.

Limitations of the evaluation

GCC provided a number of documents that present aggregated claims for the results achieved by the DIF-H-funded projects. It is important to understand that these results claims are based on reports made by project grantees submitted to GCC through routine monitoring procedures. GCC project officers review and critique these claims to check that they are plausible, and seek further information from grantees, if required. The results may then be adjusted based on these discussions.

Limitation 1: Although this monitoring approach is not uncommon, it does mean that data are self-reported, and in the absence of systematic audits of project results, there is no way to confirm their validity.

Mitigation strategy: In an attempt to understand and confirm the aggregated results claims made in the results documents, the evaluators independently analyzed the results of individual projects presented in the GCC project database. However, when reporting results, GCC explicitly focuses on its top performing projects, highest investments, and projects that have been completed. Furthermore, there are several results documents that represent results from different points in time, so the more recent data sources include more projects as these projects begin to generate results or are completed. GCC has also been refining its approach to calculating results and therefore may update results claims previously presented in data sources. Tables 12 and 13 in Annex C show the data sources, when these sources were current, the total number of projects that were in the portfolio at that time, and the number of projects that their results claims are based upon.

Limitation 2: The outcome of this reporting approach is that there are multiple results claims, and there is missing information for projects that are not considered top performing or are incomplete. Therefore the independent analysis of the GCC database was not able to pinpoint an exact figure of the results achieved by DIF-H.

Limitation 3: Due to missing project outcome information, the project database validation will under-report results compared to GCC results claims documents. Furthermore, the bases for some claims are unknown because they could not be cross-checked.

Mitigation strategy: To capture more comprehensive data on individual projects and cross-reference the GCC-reported claims with an independent source, the evaluators conducted a survey of GCC applicants and grantees. However, it is important to note that the survey results for the grantees may be subject to positive reporting bias. This bias arises when individuals requested to take part in a survey are more likely to respond if they have positive results to report. Because approximately 50% of grantees responded to the survey, it is possible that the survey collected disproportionately more responses from “successful” grantees. Furthermore, when interpreting the results, it is also important to note that the validity of the grantee-reported claims was not cross-checked. Therefore, it is possible that grantees could under- or over-report results. If this response bias occurred, it would normally result in higher claims of success than actually occurred (Furnham, 1986).

Limitation 4: While the survey provides an alternative data source to determine the results achieved by DIF-H, it cannot be considered objective and has its own reliability limitations. Importantly, there is potential for biases that could inflate the reported results achieved.

Mitigation strategy: All the above data are based on grantee self-reports. The qualitative interviews and focus group discussions provide an alternative source of information with which to cross-check the self-reported results. The field visit in Peru was particularly helpful because it allowed the evaluation team to meet with and observe DIF-H-funded projects and grantees and consider if the evaluation findings appear representative of what is actually happening on the ground. However, resource constraints meant that case studies could only be conducted in one country and it is still possible that key informant responses were biased.

Findings

Core Issue 1: Continued need for the program

1.1 Does DIF-H address a demonstrable need, and has it evolved to meet emergent needs?

Main message: DIF-H addresses demonstrable needs for Canadians and the international community.

- Needs addressed by DIF-H include the continuing need for financing to support innovations in global health, resolving barriers to global health and safety, and promoting development and equity in low- and middle-income countries (LMICs).
- Innovation is recognized as a relevant and cost-effective way to address global health challenges in LMICs.
- Investment in DIF-H has contributed to positioning Canada at the forefront of international efforts to rethink development modalities.
- DIF-H provides Canadian innovators with increased opportunities to engage with LMIC innovators and research institutions.
- The Canadian public values this national support to international development and global health, as it recognizes the potential dangers of global health risks.

1.1.1 Global health as an international development priority

Global health continues to be a priority in international development. The Sustainable Development Goals (SDGs) recognize that progress has been made in some areas, but new approaches and greater resources and effort are required to resolve persistent barriers to global health and equity (United Nations, 2015b; World Health Organization [WHO], 2013b). The DIF-H-funded targeted grand challenges and many of the innovator-defined projects are particularly aligned with the following SDGs (United Nations, 2015a):

- **Goal 2:** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- **Goal 3:** Ensure healthy lives and promote well-being for all at all ages
- **Goal 6:** Ensure availability and sustainable management of water and sanitation for all
- **Goal 9:** Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
- **Goal 17:** Strengthen the means of implementation and revitalise the global partnership for sustainable development

There is also some alignment with **Goal 5:** achieve gender equality and empower all women and girls.

Canadians increasingly recognize that improvements in global health contribute to increased global safety by addressing risks from pandemics and new/emerging diseases that transcend geographic boundaries and may be very difficult to manage once they are established. These challenges require both a continued investment in health systems

strengthening and an intensified search for targeted, innovative solutions (WHO, 2013b). The relationship between population health and economic development is also well established and represents an important additional rationale for investment in DIF-H (WHO Commission on Macroeconomics and Health, 2001; Lancet Commission on Investing in Health, 2013).

Owing to their different remit, the findings of the Expert Review Panel on GCC provide more detailed discussion on the alignment of GCC grand challenges with international health priorities. In general, there is agreement between the findings of the Expert Review Panel and this summative evaluation of DIF-H on this issue.

1.1.2 The relevance of innovation to global health development

There is a growing recognition of the need to continue with and increase investments in innovations for global health; funding of projects through DIF-H directly responds to this need. Evaluation of the precursor to the SDGs, the Millennium Development Goals, shows that a significant proportion of the gains in MDGs 4, 5, and 6 were related to research and development investments (WHO, 2013b). A number of international fora, including the Global Health and Innovation Conference held at Yale University in March 2015³ and the United Nations Strategy “Every woman every child,”⁴ have articulated this need.

The literature also suggests that the global community is facing an “implementation bottleneck.” Weak infrastructure and health systems result in an inability to deliver innovations and other effective interventions at scale (Whitworth et al., 2010). Given this situation, there is a push for more research and innovation to create new technologies, and to turn existing knowledge into practical applications (WHO, 2013b).

The Lancet Commission on Investing in Health (2013), “Global Health 2035 – a World Converging within a Generation,” suggests that research and development for new technology and scaling can save lives and can be highly cost-effective (Lancet Commission on Investing Health, 2013). The World Health Report 2013 also highlighted the importance of supporting local ideas and targeting more research attention to specific LMICs’ global health issues, and noted that the yield from such investments is potentially very high where coverage of large beneficiary populations is achieved (Lancet Commission on Investing in Health, 2013).

1.1.3 New approaches to global health development

There is a growing opinion that the current modalities of development should be challenged and a new ecosystem for development created.⁵ For example, USAID launched a broad reform in 2010, with seven main priorities, including technology and innovation. Investment in DIF-H increases Canada’s influence in these international discussions, which include new approaches to aid delivery, more systematic inclusion of beneficiaries as active participants, stronger engagement by the private sector, robust measurement of impacts, and high-quality evaluation.

In the Canadian context, there is a move toward greater partnership in ODA with the private-for-profit and private-not-for-profit sectors, and that has provided a greater emphasis on innovation. Pierre Jacquet, President of the Global Development Network, recently made the

³ See www.uniteforsight.org/conference/

⁴ See <https://sustainabledevelopment.un.org/sdinaction/everywomaneverychild>

⁵ An ecosystem for development is defined by Runde and Savoy (2004) as “a conglomeration of various entities to deliver aid, including non-profit and for-profit organizations, governments, multilateral institutions, NGOs and foundations.”

case for the utilization of ODA to create mechanisms for risk-sharing between the private and the public sector, under the supposition that this will attract private investment to development activities and support development-focused entrepreneurship (Mirabile and Schmerler, 2014).⁶

It is the opinion of several external key informants, the Expert Panel, and the evaluators that the DIF-H fund has helped to position Canada as an influential participant in these international efforts to rethink modalities for global health and development.

1.2 DIF-H responsiveness to the needs of Canadians

DIF-H provides increased opportunities for Canadian innovators and institutions to work with counterparts in LMICs. The universities of Toronto, British Columbia, Calgary, and Alberta, and McGill University are among the institutions that have single and or multi-country LMIC partners. The funding provided by DIF-H represents an important addition to the global health and innovation opportunities available to Canadian researchers and innovators. GCC also provides individual and institutional capacity development activities through training and networking that mutually benefit Canadian and LMIC researchers.

DIF-H also has relevance in relation to the needs of the Canadian government, policy-makers, and the public. Canadians are increasingly aware that they are not isolated from the health problems that affect the lives of people around the world, as was recently demonstrated by the H1N1 outbreak (Blendon et al., 2004; Public Health Agency of Canada, 2010). Indeed, the Canadian government estimates that Canadians have contributed \$110 million⁷ to combating the recent Ebola outbreak. The projects funded by DIF-H could provide important tools for contributing to the fight against global health threats, and thereby protect Canadian interests.

Canadians also consider the kind of work undertaken by DIF-H to be valuable. A recent poll by Angus Reid⁸ found that “77% of Canadians think that it is important for Canada to be known as a world leader in funding solutions to reduce poverty and advance child and maternal health initiatives” (Make Poverty History Canada, 2010). The poll concluded that “Canadians are a compassionate and generous people. [They] are proud of [their] commitment to help the poorest and most vulnerable at home and abroad. Canadians expect their government to lead by example in the area of international assistance by delivering on its promises; ensuring aid is effective and implementing innovative approaches to development cooperation” (Department of Foreign Affairs, Trade and Development Canada, 2013).

⁶ President of the Global Development Network, in an OECD book, 2014.

⁷ See www.healthycanadians.gc.ca/diseases-conditions-maladies-affections/diseases-maladie/ebola/response-response/index-eng.php?id=response

⁸ In June 2010, before the G8 Summit in Toronto, Canadians were polled by Angus Reid, in partnership with Make Poverty History.ca.

Core Issue 2: Alignment with government priorities

Main message: DIF-H is well aligned with the Government of Canada’s thematic priorities in global health, development, and innovation.

- Global health is a priority for Canadian official development assistance (ODA). Within global health, maternal, neonatal, and child health is a key priority.
- Innovation is considered to be a key development modality by the government, nationally and internationally.
- There is partial geographical alignment with countries of focus for Canadian ODA.

2.1 Alignment with Canadian priorities in international development

The Official Development Assistance Accountability Act (Ministry of Justice, 2013) states that Canada’s ODA is to be “provided with a central focus on poverty reduction and in a manner that is consistent with Canadian values, Canadian foreign policy, the principles of the Paris Declaration on Aid Effectiveness of March 2, 2005, sustainable development and democracy promotion and that promotes international human rights standards.” In terms of sectoral priorities, Canada has identified six priorities: 1) increasing food security; 2) securing the future of children and youth; 3) stimulating sustainable economic growth; 4) maternal, newborn, and child health; 5) advancing democracy; and 6) promoting stability and security.

In 2010 the Prime Minister of Canada declared that maternal, newborn, and child health remains the government’s number one development priority. Canadian contributions to maternal, newborn, and child health have been delivered through the finance and leadership of the Muskoka Initiative (2010–2015) and the Global Financing Facility for the global movement, “Every Woman, Every Child.” The Canadian Academy of Health Sciences report, “Canadians Making a Difference,” suggests that maternal and child health, and communicable and non-communicable diseases (including mental health), continue to be among the key global health issues.

The investments that GCC is making through Saving Lives at Birth (SLAB), Saving Brains, and Global Mental Health all directly align with these Canadian government priorities. Many of the grants made through the Stars in Global Health (Stars) grand challenge also relate to these thematic priorities. Evidence from key informants strongly supports the view that DIF-H’s support to maternal and child health has helped to leverage international attention and attract additional sources of finance. Key informant interviews and the Expert Panel Review further referenced how GCC has brought attention to neglected areas of global health such as global mental health.

2.2 Alignment with innovation and engagement of the private sector

The federal government’s funding of DIF-H as a vehicle for innovation is highly consistent with its roles and responsibilities and policies. In the health sector, Canada promotes innovation to ensure a sustainable health care system. It funds institutions such as the

Canadian Institute for Health Information and the Canadian Agency for Drugs and Technologies in Health, which support the use of innovation for developing technologies to address domestic health challenges (Health Canada, no date). Internationally, the federal government supports innovation through agencies such as IDRC. In 2009 the board of governors of IDRC approved a Strategic Framework (2010–2015), which had science, technology, and innovation as one of four areas of focus (IDRC, 2009). Innovation is also a theme that runs through two of the Department of Foreign Affairs, Trade and Development's (DFATD) priorities for 2015 to 2016 (DFATD, 2015).

The Government of Canada is committed to innovation in health and other sectors, working in close partnership with both the public and private sectors. In considering its aid profile, the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) recognizes Canada as a country that “promotes ODA as a catalyst to bring private sector investment to support development efforts in partner countries” (OECD, 2014).

DIF-H is also broadly aligned with other Canadian government sectors, such as industry and trade. The Economic Action Plan 2015 announced in the 2015 federal budget will provide \$1.5 billion in funding over five years to advance the government's renewed science and technology strategy (Government of Canada, 2015). This includes stable long-term support for advanced research through the federal granting councils and the Canada Foundation for Innovation. DIF-H is consistent with this policy direction of the government, as demonstrated by GCC being mentioned in the 2015 budget.

2.3 Alignment with Canadian geographical priorities

Canada identifies countries of focus for receipt of its ODA support. Currently there are 25 priority countries, including a subset of 10 countries (Afghanistan, Bangladesh, Ethiopia, Haiti, Malawi, Mali, Mozambique, Nigeria, South Sudan, and Tanzania) where support is particularly needed in the area of reproductive, maternal, neonatal, and child health (Government of Canada, 2014).

While DIF-H grants are broadly aligned with these ODA foci, DIF-H supports grantees in many more countries ($n=54$) than there are ODA priority countries. Therefore some DIF-H grants are inevitably given to countries that are not ODA priority countries. However, the evaluators identified a compelling argument as to why this apparent lack of alignment should not be a matter for concern: if and when innovations are scaled up, these innovations are expected to benefit ODA priority countries.

Core Issue 3: Alignment with federal roles and responsibilities

Main message: The consortium mechanism for DIF-H was relevant for the management of an innovation fund and as a funding delivery vehicle.

- The decision to create GCC as a new organization is appropriate and remains valid at the present time.
- DIF-H lacks a clear strategic vision for coordinating with, and working alongside, the wider governmental aid effort.

3.1 DIF-H support to federal roles and responsibilities

The development of innovation requires an approach that is based on rigorous science, yet is able to be adaptive and responsive, while also managing the risks that are inherent when investing in innovations. The DIF-H consortium was specifically set up to provide these inputs by leveraging the strengths of each consortium member: CIHR with its excellence in scientific rigour; GCC as a flexible and responsive delivery vehicle; and IDRC providing oversight and accountability through its years of experience and reporting line to the government.

In adopting the consortium approach to program delivery, a decision was taken not to establish a governance structure for DIF-H. Rather, DIF-H was created without a board of directors, without a leadership structure, and without an overarching, program-wide strategy. Instead, both IDRC and CIHR are represented on the GCC board by their respective presidents. From the Government of Canada's point of view, this was an important consideration as it allowed the government's interests to be represented at board discussions and in the development of GCC strategy.

3.2 DIF-H alignment and complementarity with Canadian ODA⁹

DIF-H follows the DFATD Report on Plans and Priorities insofar as it focuses on one of its ongoing priorities: "lead Canada's international efforts to reduce global poverty and provide humanitarian assistance" (DFATD, 2014). The report states under this priority: "Canada will continue to show global leadership in improving maternal, newborn, and child health, building on the successful investments of the Muskoka Initiative on Maternal, Newborn and Child Health. Canada's international development initiatives will remain focused on alleviating poverty by pursuing new and innovative partnerships, particularly with the private sector."¹⁰ As mentioned in Section 1.1, DIF-H focuses both on maternal, newborn, and child health as well as on pursuing new and innovative partnerships.

In a report to Parliament on the government's ODA in 2013, Canada's Minister of International Development, declared that a whole-of-government approach was required to respond to Canada's international assistance priorities. This should involve the various federal departments and agencies working together to provide ODA according to their respective mandates and competencies (DFATD, 2013). In this line, DIF-H offers a valuable contribution to Canada's

⁹ ODA is defined as flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character, with a grant element of at least 25%. Source: *OECD Glossary of statistical terms: Official Development Assistance (ODA)*.

¹⁰ Ibid.

diplomatic agenda by providing an important entry point for engagement with LMIC countries. GCC has also established an impressive set of both formal and informal international partnerships, networking groups, and opportunities, which allow countries, organizations, and grantees to share ideas and promote innovation for health.

However, at a more strategic level there remain opportunities to better coordinate the GCC-funded activities with the general thrust (as opposed to program-to-program linkages) of other government development programs. DFATD's health systems strengthening strategies and IDRC and CIHR's knowledge translation strategies could serve to strengthen the implementation of innovations arising from GCC's activities. As GCC's operations and influence grow, it should consider a joint exercise with relevant agencies to develop a strategy for coordination and working alongside Canadian ODA activities and other governmental development initiatives.

3.3 DIF-H alternative delivery models

The evaluation considered the options that were available to the Government of Canada at the time DIF-H was created, and noted that although a thorough analysis of the potential alternatives was not conducted, the decision to establish GCC as a mechanism for program delivery was appropriate.

Although CIHR fulfilled the criterion regarding scientific rigour, and it had established similar programs through its world-leading work on knowledge translation, its organizational mandate would not have allowed it to support an extensive body of research commissioned outside of Canada. In regard to IDRC, it had experience in operating similar challenge funds and was the most appropriate existing institution that could have been selected as an implementing agency. However, it was assumed that an independent not-for-profit organization would provide greater flexibility and organizational responsiveness, which was considered important for the success of DIF-H in terms of funding innovation.

With no ideal independent not-for-profit organizations available that met the criteria for DIF-H implementation, the decision to create GCC as a *de novo* organization was appropriate. The Government of Canada could have considered making its contribution to health innovation by providing funding to an existing challenge fund, such as that created by the Bill and Melinda Gates Foundation, but this would have created difficulties with regard to branding and would have reduced attribution to Canada. The analysis of delivery options made at the time DIF-H was created remains valid at the present time.

Core Issue 4: Achievement of expected outcomes

This results section is structured according to the GCC logic model, which indicates the kinds of results that DIF-H should achieve (see Annex F). However, no specific targets (i.e., precise numbers) were set for the results expected, which makes it difficult to objectively determine whether DIF-H achieved its **expected** outcomes. As a result, judgements on whether DIF-H achieved its expected objectives are based on the evaluators' view of what would be a reasonable achievement for a program of this type at this point of time.

As explained in the methods section of this report, each source of evidence on DIF-H results has its limitations. These limitations mean that, for some of the results, it is not possible to determine an exact figure. Where this is the case, a range is given and the evaluators offer their best estimate, based on the rigorous triangulation of best evidence.

We specifically highlight the lack of consistency in results reports, both internal and external. This is an important finding of the evaluation, not only a limitation of the study design. The implications of inconsistent performance measurement and inaccurate reporting practices are discussed as detrimental to DIF-H in the sections that follow. Specific attention to this issue is given in Section 4.5.

In addition, it should be noted that no GCC performance data on the results produced by the Explorations and Hypertension grand challenges were received by the evaluators. It is understood that these were early projects funded in collaboration with partners; however the evaluators were not given data on them. The survey designed and fielded by the evaluators for this evaluation did collect data on Explorations and Hypertension.

Finally, the reported results should be interpreted with an understanding that a long timeline to impact is expected for many of the DIF-H-funded projects; therefore further (positive or negative) results from current investments are expected in the future.

4.1 Ultimate outcomes

Main message: Ultimate outcomes have been achieved.

- DIF-H-funded projects have saved and improved lives. For an innovation funding program at just over five years' maturity, this is commendable.
- Although precise figures cannot be pinpointed, triangulation of the best available evidence indicates the figures to be in the region of 8,689 lives saved and 160,000 lives improved over the course of the DIF-H program.

4.1.1 Lives saved

Considering conservative estimations, the evaluators consider that projects funded through DIF-H and managed by GCC have saved lives. The exact number cannot be precisely determined but the evaluators consider it to be between 209 and 16,415. Based on the available data, we estimate that the most appropriate single figure is 8,689.

The evaluators were only able to identify 209 lives saved, based on validation of the GCC project database, despite it containing the same projects as the Strategy Roadmap, which

claims 8,689 lives saved. This is largely due to insufficient information or missing project data. Although information from the evaluators' own GCC portfolio reviews suggests that Strategy Roadmap claims are plausible, the evaluators were unable to confirm exactly how the aggregated claims were calculated by GCC staff. This lack of transparency potentially undermines the credibility of DIF-H results. Moreover, lives saved claims made in the Results Dashboard are largely unverifiable because there is no information for some of the highest claiming projects.¹¹ Therefore, the evaluators consider the figures presented in the Strategy Roadmap to be the best available estimate.

Table 4: Number of lives saved claimed for each GCC data source

Data source	Internal monitoring data			Official reports	
	GCC Dashboard (Current Jun-15)	Strategy Roadmap (Current Mar-15)	Validated GCC database (Current Mar-15)	2013-2014 Annual Report (Current Mar-14)	2015 Annual Letter (Current May-15)
Stars	958	948	38	x	x
TTS	7,796	80	0	x	x
Diagnostics	114	114	171	x	x
Explorations	x	x	x	x	x
SLAB	x	7,547	0	x	x
Saving Brains	x	x	x	x	x
Global Mental Health	x	x	x	x	x
Hypertension	x	x	x	x	x
All grand challenges	8,868	8,689	209	x	~10,000

"x" denotes that no information was available.

GCC monitoring and reporting: The lower figure represents the verifiable disaggregated results from the GCC project database, and the higher figure is a summation of the maximum claims for each grand challenge across all results claims documents. The number of lives saved claimed by GCC in each reporting source is shown in Table 4.

Independent validation: Results from the survey show that 39% of GCC grantees claim that their projects saved at least one life. This is a much higher proportion than is claimed by GCC in its results documents. Although this may be partly due to reporting bias, it is highly suggestive of a significant impact on lives saved.

¹¹ For example the project delivered by JSI Research and Training Institute, which has 7,500 lives saved attributed to it. After obtaining clarification, it is understood that this is a USAID-managed project that was co-funded by GCC; 100% of the results have been attributed to all donors.

Qualitative findings from the Peruvian in-person site visits also indicate that DIF-H-funded projects have saved lives, and there were reports from grantees that GCC project officers amended claims to be more conservative.

4.1.2 Lives improved

Considering conservative estimations, the evaluators consider that projects funded through DIF-H and managed by GCC have improved lives. The exact number cannot be precisely determined but the evaluators consider it to be between 136,905 and 252,452. Based on the available data we estimate that the most appropriate single figure is 160,313.

The higher figures found by the evaluators in the project database compared to those of the Strategy Roadmap are due to different interpretations of what constitutes lives improved. This suggests that GCC is conservative in its calculation of lives improved, and the maximum GCC claims for lives improved are likely to be a fair estimate. This equates to a summation of the highest claims for each grand challenge reported in the Dashboard and Strategy Roadmap: 160,313.

Table 5: Number of lives improved claimed for each GCC data source

Data source	Internal monitoring data			Official reports	
	GCC Dashboard (Current Jun-15)	Strategy Roadmap (Current Mar-15)	Validated GCC database (Current Mar-15)	2013-2014 Annual Report (Current Mar-14)	2015 Annual Letter (Current May-15)
Stars	44,853	38,329	194,982	x	x
TTS	106,511	89,627	38	x	x
Diagnostics	3,260	3,260	3,798	x	x
Explorations	x	x	x	x	x
SLAB	x	117	27,341	x	x
Saving Brains	x	3,171	0	x	x
Global Mental Health	x	2,401	26,293	x	x
Hypertension	x	x	x	x	x
All grand challenges	154,624	136,905	252,452	x	~150,000

'x' denotes that no information was available.

GCC monitoring and reporting: The lower figure represents the claims made in the Strategy Roadmap, and the higher figure represents the evaluator's analysis of individual project reports in the GCC project database. The number of lives improved claimed in each GCC reporting source is shown in Table 5.

Independent validation: Results from the survey show that 77% of GCC grantees claim that their projects improved at least one life. Following the same pattern as lives saved, this is a much higher proportion than is claimed by GCC in its results documents, which is highly suggestive of a significant impact on lives improved.

Qualitative and observational findings from the Peruvian case studies also indicate that DIF-H-funded projects have improved lives.

4.2 Intermediate outcomes

Main message: Intermediate outcomes have been achieved.

- Triangulation of the best available evidence indicates that approximately 3.69 million target beneficiaries accessed innovative health products and services developed using DIF-H funding.
- The projects funded by DIF-H have had a positive impact on health policies, training practices, and health systems.

4.2.1 Access to innovations

The evaluators estimate that between 3.69 million and 5.28 million target beneficiaries accessed an innovative health product or service that was developed using DIF-H funding.

GCC monitoring and reporting: The lower figure represents the GCC claims in the Strategy Roadmap, and the higher figure is a summation of the maximum claims for each grand challenge across all results claims documents. The number of target beneficiaries who accessed an innovative health product or service, for each data source, is shown in Table 6.

Table 6: Number of target beneficiaries who accessed an innovative health product or service, for each data source

Data source	Internal monitoring data		Official reports	
	GCC Dashboard (Current Jun-15)	Strategy Roadmap (Current Mar-15)	2013-2014 Annual Report (Current Mar-14)	2015 Annual Letter (Current May-15)
Stars	76,151*	1,248,122	619,707	x
TTS	1,729,608	137,898	x	x
Diagnostics	1,015,717	1,015,717	x	x
Explorations	x	x	x	x
SLAB	x	1,233,984	555,349	x
Saving Brains	x	4,925	x	x
Global Mental Health	x	46,488	20,427	x
Hypertension	x	x	x	x
All grand challenges	2,821,476	3,687,134	1,195,483	x

"x" denotes that no information is given.

*This number only includes improved access from the six top performing Stars projects.

A review of the GCC database reveals that the majority of claims appear plausible. However, the Dashboard attributes access by 1.5 million target beneficiaries to the JSI Research and Training Institute project. Therefore the evaluators consider the Strategy Roadmap to be the most conservatively reliable estimate.

Independent validation: Results from the survey show that 33% of GCC grantees claim that their projects increased access to products/services. Since the GCC claims for increased access are high, while at the same time the survey suggests that only a third of projects increase access, this would mean that the few projects that increase access do so considerably. A review of the top performing projects reveals that this is indeed the case, with the vast majority of improved access claims being attributable to only a few projects.

The Peruvian case studies also captured compelling evidence that DIF-H-funded projects have increased access to innovative products funded through DIF-H.

4.2.2 Positive impact on health policies, training practices, and health systems

GCC monitoring and reporting: The annual report claims that DIF-H-funded projects have influenced 20 health-related policies/regulations in developing countries. However, a review of the projects database reveals that 61 projects have had a positive impact on health

polices, training practices, or health systems. The extent of this positive impact was highly variable, ranging from incremental small-scale changes to national policy reforms with important health care implications. However this review also highlighted projects that had the potential for unintended and damaging impacts on health systems. These are discussed further in Section 5.5.3.2.

Independent validation: The more recent, and higher, claims in the project database are supported by results from the survey, in which 18% of GCC grantees claim that they have changed health polices for the better, 24% improved training practices, and 19% had a positive impact on health systems.

During the Peruvian case studies, the evaluators heard compelling evidence that the findings from DIF-H projects had resulted in important changes to national health policies and procurement practices.

4.3 Immediate outcomes

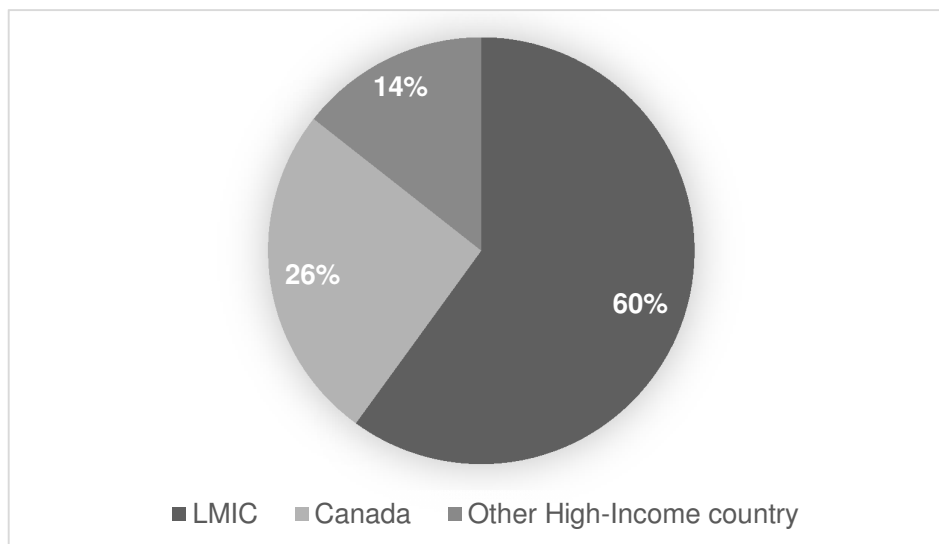
Main message: Immediate outcomes have been achieved.

- DIF-H investments have created work and funding opportunities to address global health through innovation.
- In accordance with the DIF-H theory of change, GCC has made successful efforts to promote organizational and project partnerships, build networks, and develop capacity to support health innovation projects.
- These activities have contributed to increased knowledge and awareness of a positive international Canadian brand related to global health innovation.

4.3.1 Work and funding opportunities to address global health through innovation

GCC claims it has created 578 jobs in Canada and 7,018 jobs in LMICs. The evaluators were not able to validate these claims, partly because the indicator used by GCC is conflated, as it also includes livelihoods improved in the reported numbers. However, these numbers are plausible based on the survey responses, as GCC grantees claim that 13% of projects created jobs in Canada and 49% created jobs in LMICs.

GCC has awarded \$42 million of DIF-H funding to Canadian institutions undertaking health innovation projects, and around \$100 million to LMIC institutions for the same purpose. Institutions in high-income countries (HICs) other than Canada received \$24 million. The proportion of DIF-H funding allocated by region is shown in Figure 5.

Figure 5: Proportion of DIF-H funds allocated by region

In addition to DIF-H funding, GCC has also leveraged and secured venture capital funding amounting to more than the original DIF-H investment. This has been, or will be, directed to further health innovation projects.

Importantly, the survey demonstrates that the majority of DIF-H-funded projects (78%) were specifically developed in response to GCC grant calls, rather than being adapted or repurposed. This suggests that DIF-H funding is not fungible with other donor grant calls, and represents a relatively unoccupied space.

4.3.2 Promoting partnerships, networks, and capacity to support health innovation

GCC's achievements in increasing the adoption of the grand challenge approach in other countries (Israel, Peru, India, Brazil, and Thailand), and contributing to enhancing the approach in the United States, are also to be applauded. Although the new grand challenge models are in their early stages, they will likely result in further funds and jobs focused toward health innovation projects by national governments.

In accordance with the DIF-H theory of change, GCC has made successful efforts to promote partnership between health innovators in HICs and LMICs (North–South partnership), and among innovators in LMICs (South–South partnership). This was mainly achieved by stipulating that HIC applicants must have a partner from a LMIC. The survey found that 65% of GCC-funded projects involved a collaboration between the primary grantee and one or more partners. In 16% of projects at least one of these partners was from a Canadian institution, and in 30% of projects these partnerships were between individuals that had not previously worked together.

GCC has also successfully supported networking and capacity building of its grantees through its targeted challenge-specific communities of innovators, community meetings, and annual grand challenges meetings. Based on GCC-administered feedback surveys that were validated by the evaluators, these meetings were largely well received and deemed to facilitate networking and improve specific capacities.

According to the grantee survey, 85% of GCC grantees benefited from at least one networking opportunity, and 69% were either satisfied or very satisfied with the networking opportunities provided. The survey also shows that 91% of GCC grantees were enabled in at least one type of capacity. Additionally, 69% of projects funded by GCC resulted in at least one innovator being trained, while 13% trained 10 or more innovators, although 30% did not train any innovators.

The case studies in Peru further confirm these successes, with several grantees reporting that their capacity was strengthened and commenting on the importance and usefulness of GCC networking events.

4.3.3 Increased knowledge and awareness of a positive international Canada brand

Increased knowledge and awareness of a positive international Canada brand has largely been achieved through GCC's concerted communication and international engagement efforts. These have included working with other international donors to form targeted challenge-specific global partnerships; helping create and enhance other countries' grand challenges models; engaging with the Canadian diaspora to encourage it to support the projects funded by DIF-H; and publishing and disseminating achievements through publications, articles, and social media.

These international engagement efforts have also provided Canada with a useful diplomacy tool, especially in countries that are forming grand challenge family models. One diplomat interviewed by the evaluators described how GCC was particularly good at engaging with Canadian official representatives abroad, and said that other development programs could learn from it to improve their connectedness with Canadian foreign relations. This willingness of GCC to cooperate and play a leadership role in international global health efforts has also been noted by other grantees and independent key informants.

These activities have positioned Canada as a strong player in the global arena of health innovation, even though the funding provided to DIF-H is relatively small compared to other Canadian ODA and international investments. Therefore, DIF-H's strategy of acting as a catalyst for global health innovation appears to have been realized; it was colloquially suggested by one independent interviewee that "DIF-H really punches above its weight."

However, there is some concern from key informants that the Government of Canada does not receive enough credit for DIF-H achievements, given its investments in DIF-H. GCC has been careful to ensure that funding by Canada is acknowledged in all of its communication, and a visibility agreement between GCC and DFATD is planned to ensure that the government gains appropriate recognition. However, this agreement has not yet been developed. While this is an area for debate and potential negotiation, the survey found that 67% of GCC applicants knew that GCC grants were funded by the Canadian government (8% thought GCC was funded by the Bill and Melinda Gates Foundation). Furthermore, it was mandated that DIF-H should increase knowledge about, and branding of, Canada as a country, not the government, and this has been achieved.

4.4 Outputs produced

Main message: DIF-H has produced outputs.

- DIF-H-funded projects have developed a large number of innovations.
- Grantees have been successful in publishing results in peer-reviewed journals, sharing their knowledge, and securing patents for their innovations.
- The projects funded by GCC appear to be relatively successful at scaling to further development or implementation. However, these high success rates suggest that DIF-H may be unduly risk averse.
- Using DIF-H funds, GCC has effectively leveraged funds and secured financial investments that exceeded the total DIF-H budget provided by the Government of Canada.

4.4.1 Innovative prototypes or service delivery models developed

The most recent report of the number of innovations developed comes from the GCC Annual Report 2013–2014, which claims that 346 innovations have been developed. This definition of innovation includes prototypes, service delivery models, and models developed through economic modelling.

This number appears quite high given that many projects have yet to finish and at the time of this GCC annual report there were fewer investments in GCC’s portfolio. However, these success rates appear plausible based on analysis of the database and survey. Within the database approximately 20% of projects failed to demonstrate proof-of-concept,¹² while GCC grantees reported in the survey that only 2% of projects failed to reach proof-of-concept.

While this success rate can be considered impressive, it does not appear to be aligned with GCC’s vision for bold innovations with big impact. Authors argue that the pursuit of innovation needs to be risky, and therefore a large number of attempts at innovation are likely to fail (Al-Dabal, 1998; Hargadon et al., 2000). If this level of risk is not accepted, truly innovative and transformational ideas are less likely to be found (Perrin, 2002). Zider (1998) suggests that “on average, good plans, people, and businesses succeed only one in ten times” (Zider, 1998, p. 136). This is not to suggest that a *laissez-faire* approach to investment should be acceptable and that calculated risk is not necessary, but rather to emphasize that traditional performance assessment mindsets that failures are inherently bad should not apply to innovation. Therefore GCC may wish to reconsider its selection criteria to be more risk-tolerant.

Nevertheless, the fact that the majority of DIF-H-funded projects were specifically developed in response to GCC grant calls, rather than being adapted or repurposed, suggests that DIF-H is encouraging novel ideas.

¹² ‘Proof-of-concept’ refers to the stage of innovation product/service development where an initially unproven concept or idea has been tested through a pilot stage, and has been shown to be effective during small-scale investigations in a relatively controlled environment.

4.4.2 Publications, patents, and knowledge sharing

Based on the outcome statements in the database, GCC grantees have published a total of 185 academic publications and secured 57 patents or patents pending. These publications and patents come from 9% and 6% of all projects, respectively, including those that are incomplete or that have failed to demonstrate proof-of-concept. These database findings are supported by the survey, which claims even higher rates of publications and patents (including patents pending) per project: 34% and 26%, respectively.

In addition to publications, both the GCC database and the survey reveal that the majority of GCC grantees have also shared their knowledge through less formal mechanisms, such as conference presentations, workshops and seminars, and non-peer-reviewed journals, working papers, newspapers, blogs, and other social media.

4.4.3 Innovative prototypes or service delivery models transitioning to scale

Of the projects that demonstrated proof-of-concept ($n=208^{13}$), 20% transitioned to scale through GCC grants or other funding mechanisms. Transitioning to scale refers to when a pilot or proof-of-concept study demonstrates success and receives further investment to expand development or implementation.

Projects from the Diagnostics portfolio have been most successful at transitioning to scale (40%), followed by the targeted challenges projects (30%), with the Stars projects being least likely to transition to scale (17%). This pattern is to be expected given that the Diagnostics and targeted challenge projects are generally larger and less risky investments that are often further along the development pipeline at the time of investment. However, according to innovation literature (Zider, 1998; Perrin, 2002), even the transition to scale rate of 17% for the Stars projects is good, especially given their low-investment high-risk profile.

4.4.4 Venture capital secured and funds leveraged

Using DIF-H funds, GCC has secured venture capital through the Global Health Investment Fund, for which they provided the anchor investment (\$9.8 million). This fund was created for private sector companies and individuals to invest in global health innovations. The value of the fund is now over \$96 million. Engaging with such an innovative financing mechanism represents a potentially important pool of funding for future investments in late-stage global health innovations.

Through co-financing, the total value of GCC's funded projects is significantly higher than the total DIF-H budget. GCC achieved this through:

- (i) **Program-level co-funding** — forming international partnerships with other donors and development agencies, with whom GCC shares the results, to support the grand challenges programs. This effectively pools funds to support common causes. The majority of this funding went to the targeted challenges portfolios.
- (ii) **Project-level co-funding** — requiring matching funds from project partners for some of their project-specific investments. Matching funds could come from public or private

¹³ This excludes projects in the TTS portfolio.

sources. The majority of matching funding went to the innovator-defined challenges portfolios and was procured by the grantees themselves.

It should be noted that most co-financing was not channelled through GCC and did not support GCC overheads. Rather, it went directly from the co-financing donor to project grantees. A breakdown of the funds leveraged for each grand challenge is shown in Table 7.

Table 7: Breakdown of project funds leveraged

Program areas	Grand challenges	Funding leveraged (C\$)
Innovator-defined challenges	Stars – Proof-of-concept	23,269,743
	TTS	36,162,151
	Explorations	3,390,842
	Diagnostics	53,760,188
	Total	116,582,924
Targeted challenges	SLAB	44,309,023
	Saving Brains	6,661,130
	Global Mental Health	1,297,946
	Hypertension	4,006,638
	Total	56,274,737
Total		172,857,661

4.5 Monitoring and reporting of results

Main message: GCC monitoring of projects and reporting of results requires improvement.

- GCC has iteratively developed a minimal effort monitoring system that is appreciated by its grantees.
- The monitoring system is not sufficiently systematic, and indicators need strengthening.
- GCC's reporting of results claims requires greater attention to scientific rigour, transparency, and consistency. The current approach damages the credibility of claims by allowing skepticism of genuine results.

IDRC and GCC expended considerable effort in developing the original Treasury Board–defined objectives for DIF-H into monitoring indicators. This included developing the 2011 DIF-H Learning Monitoring and Evaluation Framework (LMEF) and the DIF-H theory of change. GCC subsequently tailored these DIF-H monitoring frameworks, to turn them into the Results Monitoring and Accountability Framework (RMAF) and logic model, which measures results of GCC-funded projects. GCC also developed grand challenge-specific

theories of change. This level of work and reflection is commendable and has responded to one of the formative evaluation recommendations.¹⁴

However, GCC's current project monitoring system requires strengthening. Some indicators should be revised or replaced because they are not sufficiently precise or mutually exclusive, and others are subjective. Examples include "jobs created and livelihoods improved," "intermediary access to innovations," "use of innovations," and "lives improved." "Lives improved" is particularly problematic because it overlaps with "target beneficiary access to innovations" and "use of innovations," and is entirely subjective. This was exemplified by the different interpretations the evaluators identified, as regards "lives improved" and "beneficiary access to innovations." There also seems to be some confusion over the terminology used to structure indicators: for instance, what constitutes an activity or progress indicator or output, and the difference between immediate, intermediate, and ultimate outcomes.

The only consistent source of project outcome data has been grantees' self-reported results. GCC uses a consolidated framework to collect monitoring data from the grantees: the RMAF. This was one of the formative evaluation recommendations that were followed. However, not all grantees systematically report project outcomes using the RMAF, which means results from these projects cannot be reported in the current logic model framework. These self-reported claims do undergo some plausibility checks by GCC project officers and Scientific Advisory Board subcommittees during portfolio reviews, but often there is insufficient time and data available to properly interrogate grantee claims. These issues were raised in the formative evaluation but have not been fully addressed. To improve the review process, a consistent format that provides sufficient data to properly review claims should be developed.

To ensure the validity of the grantee results claims, data validation is ideally required. The results of some projects have undergone scrutiny through a review as part of the process of publishing results in academic journals and presenting at conferences. GCC's efforts at encouraging this should be commended because it not only provides an external source of verification and disseminates findings, but also helps develop grantees' capacities, builds their research networks, and advances scientific knowledge.

Internally, GCC has validated results on an ad hoc basis. However, this appears to be becoming more routine, which will significantly improve the trust that can be placed in the results claims. For instance, GCC has recently starting conducting field visits to validate grantee claims. It also conducts random financial spot audits to ensure grantees' fiduciary transparency and performance. In addition, IDRC has conducted one field visit in Kenya and one performance audit (both in 2014). IDRC also commissioned an independent field visit in Peru as part of the summative evaluation. These additional data collection activities are important, but they should be integrated into a more systematic monitoring approach.

However, all these data validation considerations must be balanced because there is a trade-off between the robustness of a monitoring system and the level of effort and cost required. GCC acknowledges that it operates a lean monitoring system, especially for its low-investment projects. This not only saves GCC money and resources, but allows innovators to spend more of their time and grant on developing innovations than reporting to GCC. Based on the survey, it appears that the vast majority of GCC grantees appreciate this monitoring

¹⁴ The formative evaluation recommended GCC improve its measurement of progress and success (theme 7) and develop a theory of change for the scaling up of projects and corresponding monitoring plans (theme 8).

approach: 84% reported the GCC monitoring was about right, 11% said it was too much, and 4% said it was too little.

Regardless of the indicator and data quality, GCC's reporting of results claims requires greater attention to scientific rigour, transparency, and consistency. The current approach damages the credibility of claims by allowing skepticism of genuine results. For public engagement purposes, the simple and digestible key results claims are acceptable, but this must not replace the scientific reporting of results to specialized audiences who require much more detailed, transparent, and auditable results formats, in order to be able to verify claims. Disaggregated results, annexes detailing methodologies and calculations, and justifications of any changes in claims should be provided. Furthermore, results claims should only be released when they have been finalized and are supported with sufficient information to permit appraisal.

4.6 Results discussion 1: Questioning the DIF-H theory of change

The methodology running through the evaluation design allows us to test several assumptions within the DIF-H theory of change. These findings will be useful for refining the DIF-H theory of change and thereby improving program delivery, as well as informing the wider debate on grand challenges development modalities.

4.6.1 Funding innovators in developing countries

A defining feature of DIF-H's approach to funding innovation is a willingness to invest in innovators in developing countries (60% of DIF-H grant funds were allocated to LMICs). This is based on the implicit belief that innovators in developing countries have the local knowledge and expertise to address their countries' health issues. This opportunity for developing countries to establish ownership of their health problems has been applauded by grantees and key informants alike, and is a central thrust of more recent international development thinking (WHO, 2013b) (although Canadian organizations like IDRC have been using this approach for decades).

Findings from the survey show that this premise is well founded. As shown in Table 8, projects that funded innovators in LMICs were much more likely to result in lives saved, lives improved, and increased access to innovative products than projects that funded innovators from HICs. This was true even though many projects funded in HICs were implemented in LMICs. In most cases, projects funding innovators in low-income countries performed better than projects funding innovators in middle-income countries. Furthermore, this pattern also holds true when considering the immediate outcome measures: adoption of health policies, health systems strengthened, and training practices improved.

Table 8: Influence of respondents' primary institution location on project outcomes

Region of respondents' primary institution	% of projects reporting					
	Lives saved	Lives improved	Improved access to product/services	Positive impact on health policies	Positive impact on health systems	Improved staff training practices
High-income	24.3	64	27.8	14.3	21.8	16.5
Upper and lower middle-income	52.6	80	31.3	19.6	29.5	22.3
Low-income	50	89.7	44.6	24.8	21.8	21.8

All projects performed very well in regard to developing innovations and demonstrating proof-of-concept. However, projects funding innovators from HICs were more likely to result in patents and peer-reviewed publications. This is perhaps not surprising given the recognized lack of resources and capacity for publishing and protecting intellectual properties in developing countries (Nuyens, 2005). However, it is important to note that innovators in LMICs showed a strong appetite for knowledge sharing by being more likely to engage other knowledge users through less formal channels, such as seminars and conferences.

4.6.2 Funding less-experienced innovators

Aligned with the approach of funding innovators in developing countries is a willingness to fund less-experienced innovators. This is based on the belief that there is a wealth of important ideas that could improve global health, and research and development powerhouses are not the sole purveyors of such ideas. Rather, anyone, anywhere, could have potentially transformative ideas that are waiting to be tapped. This approach has been applauded by grantees and key informants. Although DIF-H does not fund a majority of early-career innovators, findings from the survey show that it funds roughly equal proportions of early-, mid-, and senior career-level innovators.

However, findings from the survey suggest that this may not be the most immediately productive approach. Self-identified senior career innovators consistently reported higher rates of ultimate, intermediate, and immediate outcomes and outputs than mid- and early-career innovators (except as regards lives improved, for which mid-level innovators reported the highest). Mid-level innovators reported higher rates of lives saved and lives improved than early-career innovators, but were generally similar across all other indicators, except for peer-reviewed publications, for which early-career innovators were more successful. The number of previous grants reported by innovators appears to have had no effect on the outcomes and outputs of their projects.

While this confirms common perceptions that projects led by more experienced individuals will be more effective, it does not necessarily contradict the DIF-H theory of change. This is because early-career innovators did indeed have good ideas and also effectively ran their projects so that they resulted in positive health outcomes and outputs. Furthermore, the survey only captures the frequency of projects reporting ultimate and intermediate outcomes, not the total number achieved by each project, so it is not known whether these gains were incremental or transformative. Therefore the approach adopted by GCC of having an equally mixed portfolio of innovators appears appropriate.

4.6.3 Funding a mixture of small and larger investments

Another feature of DIF-H project funding is GCC's decision to fund a mixed portfolio of small and larger investments. The small investments are more numerous and tend to be valued at around \$100,000. These are the Stars projects, which represent the venture capital style high-risk, low-dollar-value investments. The targeted challenge projects are usually mid-dollar-value investments of around \$250,000, and represent higher investments in more established ideas or organizations. Finally, GCC makes a few high-dollar-value investments of between \$300,000 and \$2.8 million, which tend to be well-established, lower-risk targeted challenge projects and projects that are transitioning to scale. The strategy behind this is essentially one of spreading bets: supporting the development of untested and risky but potentially transformative innovations, as well as more conservative and proven innovations.

Based on an analysis of the GCC database, there appears to be no consistent pattern in the number of ultimate, intermediate, and immediate outcomes and outputs that a project achieves when disaggregated by different values of project funding. In the absence of any clear patterns to show otherwise, the current approach seems reasonable.

4.6.4 Supporting project partnerships

A key component of the DIF-H theory of change is supporting partnerships in projects. The evaluators found that GCC is indeed effective at promoting partnership and networking. Partnerships between HICs and LMICs are thought to increase the likelihood of project success by combining the local expertise of the LMIC partner with the presumed greater capacity and research experience of the HIC partner (Costello and Zumla, 2000). However, GCC does not require LMIC institutions to have a partner, although they may choose to have a partner from an HIC or LMIC.

The effects of partnership on project outcomes were tested through the grantee survey. All respondents who received funding were requested to indicate if they had partners in their project proposal, and to provide details of the type of partners that were involved in their project (up to a maximum of three).

Projects that *did not* involve partnership were more likely to result in lives saved, and slightly more likely to result in lives improved (50% as against 35.9%, and 77.1% as against 75.6%, respectively). However, projects that *did* involve partnerships were more likely to result in all intermediate and immediate outcomes and outputs. Therefore, although the negative influence of partnership on ultimate outcomes is surprising, the positive influence on all other indicators reinforces the DIF-H theory of change and the generally held view that research partnerships stimulate impact.

This pattern may be explained by the fact that it is relatively early to expect clear associations to occur in ultimate outcomes (even for completed projects), whereas patterns in intermediate and immediate outcomes may be more established and reliable. Another explanation, which is well supported by other research and evaluation, is that impactful partnerships require meaningful engagement, which takes time and effort (Cargo and Mercer, 2008; Jagosh et al., 2012; CIHR, 2013). The result may mean that partnered DIF-H projects are earlier on the trajectory to impact. However, it is also possible that LMIC innovators who chose not to have HIC partners did so because they were already in a strong position and therefore did not need, or would not greatly benefit from engaging a Northern

partner. By contrast, the LMIC partners who were approached by an HIC innovator may have been in a weaker initial position.

This second supposition is supported by a partnership-specific breakdown of survey findings. LMIC-led HIC partnerships (where the primary grantee is based in an LMIC and the partner is based in an HIC) were the most likely to result in all ultimate and intermediate outcomes. Furthermore, compared to LMIC-led projects with no partnership, they were more likely to result in all indicators, except lives saved, which was equally likely to occur.

LMIC–LMIC partnerships were more likely to result in some outcomes than HIC-led LMIC partnerships, but not others. It is not clear why HIC–HIC partnerships were reported, as the evaluators were under the impression that these were not permitted under grant parameters. Regardless, they were the least effective type of partnership in terms of likelihood of resulting in ultimate and intermediate outcomes.

In agreement with the findings in Section 4.6.1. above, these results indicate that partnerships established by primary grantees from LMICs are likely to be more effective in terms of health outcomes than partnerships established by primary grantees from HICs; HIC-led partnerships are only more effective at producing peer-reviewed publications and patents. These data support the hypothesis that LMIC knowledge and ownership are important for development programs to have an impact (Binka, 2005).

Therefore, DIF-H's approach of not requiring LMIC innovators to have a partner, but requiring HIC innovators to have an LMIC partner, appears to be well founded. However, based on these results, DIF-H may wish to consider only accepting partnerships where the primary grantee is based in an LMIC.

4.6.5 Supporting capacity building

The DIF-H theory of change explicitly aims to strengthen innovators' capacity in order to sustainably develop innovation platforms in Canada and LMICs. As presented in Section 4.3, GCC appears quite effective at developing the capacity of its grantees. However, to understand the implications of this capacity building, it is necessary to look at the data in more detail.

According to the survey, 92% of grantees reported they improved their capacity through the DIF-H grant. The most commonly built capacities were technical skills, project leadership skills, and management skills (75%, 66%, and 62%, respectively). The least commonly built capacities were business skills, winning further project funding, and skills supporting transitioning to scale of innovations (29%, 30%, and 34%, respectively). This is problematic because the less commonly built skills are the capacities that innovators will require to graduate from proof-of-concept funding to sustainably and independently fund their innovations.

Low-income country innovators were slightly more likely to have their capacities built in nearly all types of capacity, closely followed by innovators from HICs, then middle-income countries. However, projects that were primarily based or implemented in HICs were more likely to train other innovators, followed by middle-income countries, then low-income countries. This is also problematic because LMICs are in the greatest need of well-trained innovators.

This suggests that although GCC is effective at developing innovators' capacity, it needs to focus more on building capacities to support scaling of innovations. GCC should also try to understand why projects in low-income countries are less likely to train innovators.

Perhaps surprisingly, results from the survey show that projects involving partnerships were only slightly more likely to build at least one capacity than projects not involving partnership. Furthermore, partnerships between LMIC institutions were slightly more likely to build at least three types of capacity than partnerships between LMIC and HIC institutions. However, partnerships between LMIC institutions were clearly the most effective type of partnership for building all types of capacities (except technical skills and winning further project funding).

These findings reinforce the argument that projects involving and led by LMIC innovators are better investments than projects led by HIC partners. It also suggests that if GCC decides to address the weaknesses in developing innovation scaling capacities, this attention would be best focused on projects led by, or only involving, LMIC innovators. One possibility would be to provide LMIC innovators with small amounts of additional funding earmarked for specific training or capacity development purposes.

4.6.6 Does integrated innovation work?

Integrated innovation is key to the DIF-H theory of change. It involves the “coordinated application of scientific/technological, social and business innovation to develop solutions to complex challenges. This approach does not discount the singular benefits of each of these types of innovation alone, but rather highlights the powerful synergies that can be realized by aligning all three to address a single challenge” (GCC, 2010). By undertaking integrated innovation, it is believed that a higher proportion of innovations will transition to scale and be available to beneficiaries who can reap the health benefits.

The findings from this evaluation show that DIF-H-funded projects have a very high success rate in terms of resulting in innovations and demonstrating proof-of-concept. A significant proportion of these also go on to transition to scale. This suggests that GCC's integrated innovation approach may contribute toward the development of innovative products and services.

However, the GCC database shows that of the innovative products and services that transition to scale, the majority do this through public sector channels. The apparent difficulty in scaling innovations through the private sector is attested to by key informants and case study participants: both report that there is a lack of interest from the private sector, and innovators do not know how to go about finding private sector investors and scaling through private channels. This qualitative evidence is further supported by survey data, which show that the capacity that is most lacking is business skills, and the second most lacking networking opportunities are networking with potential investors.

This suggests that although integrated innovation is effective in supporting innovation development through the public sector, scaling through the private sector remains a bottleneck. Therefore, while GCC is effective at engaging with the private sector, GCC grantees are not. Potential solutions include focusing capacity development activities on private sector scaling skills and increasing networking opportunities with potential private sector partners.

4.7 Results discussion 2: The importance of considering future results

Innovation is a long-term goal, and one would expect that a comprehensive measurement of the results achieved by all DIF-H projects would not be possible for another 10 years (Morris, Wooding, and Grant, 2011). This summative evaluation is required to assess the results that DIF-H has achieved in the last five years, but it should be recognized that some of the projects funded by DIF-H will not achieve all their outcomes (either positive or negative) for many years to come.

It is therefore surprising that so many of the projects funded by DIF-H are already achieving ultimate and intermediate outcomes. As presented in the above sections, GCC is already reaping significant health gains from relatively recent investments.

To ensure an appreciation of the potential for future gains from current investments, GCC has endeavoured to predict the impact of a few of its top performing projects using novel projection methodologies. These are a new and important addition to GCC's impact-tracking efforts that can enumerate the expected number of lives saved and lives improved that an individual project can achieve by 2030. The methodology is still being refined and must be considered as a work in progress, but so far projections for 10 of the 77 current TTS investments are predicted to result in more than 500,000 lives saved and over 7.5 million lives improved by 2030.

Nevertheless, the path to innovation is recognized as uneven, with apparently underperforming projects achieving unexpected success, and the most promising projects failing at the last hurdle (Perrin, 2002). Therefore any projections are questionable and should be treated with caution. It is also important to note that the evaluators have not validated these projections, and they include them only as a conceptual aid to consider the potential for future impacts.

However, GCC's attempts to develop methodologies to project future impacts from innovations are prudent, and could be important for the future of the field of innovation impact measurement. As the methodologies mature, they could become important tools for estimating future impacts or making more informed investment decisions.

Core Issue 5: Demonstration of efficiency and economy

5.1 Economy

Demonstrating economy “involves assessing whether minimal or fewer resources could have been used without compromising the delivery of expected outputs and outcomes” (TBS, 2009). In order to determine if DIF-H has been economical, the evaluation assessed what attempts at economy have been made by DIF-H, and if these actions resulted in an acceptable level of economy.

Main messages: An acceptable level of economy was achieved by DIF-H.

- The evaluation found evidence of economy achieved when setting up and implementing DIF-H.
- However, some of the DIF-H economies may not actually be net savings for the Government of Canada, because the services provided by CIHR and IDRC appear to be undervalued.
- Due diligence was applied to ensure that economy was an ongoing process.

The decision to establish DIF-H as a consortium provided opportunities for economies to be made by the Government of Canada; these opportunities have largely been seized. The DIF-H consortium provided its services to set up the DIF-H implementing arm, GCC, at a favourable rate that represented a strategic investment for the government.

To deliver their respective roles and responsibilities, IDRC was allocated \$4.5 million, and CIHR’s public budget allocation was increased by \$0.9 million. The cost of establishing GCC as a stand-alone organization without the nurturing support of the other consortium members would have been higher.

However, the budget allocated to IDRC and CIHR seems to underestimate the costs incurred by these consortium members. As public institutions, CIHR and IDRC were tasked with supporting the creation and functioning of DIF-H. It was economical for the Canadian government to take this approach as it already funds IDRC and CIHR. However, the evaluation was not able to calculate the real financial and resource costs to these institutions as neither institution has a system that enables tracking of how much money, time, and resources were spent on supporting DIF-H.

When assessing DIF-H’s economies it is critical to take a closer look at GCC’s operational costs: first, because GCC implements over 95% of the DIF-H budget, and second, because the finances provided to the other consortium members are not an accurate representation of their true costs. In summary, GCC put a lot of effort into achieving favourable economies, and all the inputs it acquired are on track to be fully spent.

Examples of GCC efforts to ensure economy include:

1. **Minimization of procurement costs.** GCC entered into an agreement with the Sandra Rotman Centre and University Health Network to provide work space at the University Health Network premises, as well as human resources and other administrative services

(GCC, 2012). The review of these operational agreements concluded that the operational agreements are reasonable, necessary to deliver the project, and based on market conditions. When possible, GCC set up its own account with suppliers to reduce the amount of administrative services provided by University Health Network and therefore exercise better control over its expenses.¹⁵ GCC also contracted services following competitive tendering process (i.e., for the technical platforms) ensuring that the selection of service was based on qualitative and financial assessment of proposals.

2. **Remuneration controls for GCC senior staff.** The GCC board approved GCC's existing processes for setting remuneration packages for staff. The GCC board concluded that the processes and rates are reasonable.
3. **Mechanisms to leverage significant inputs were put in place.** The evaluation found that GCC has been able to leverage significant technical support at no or very little cost by using its networks and influence.
4. **All acquired inputs were utilized, absorbed, and needed.** At 10% of operational costs, the evaluation team estimates that GCC is a lean organization, and clearly needs and utilizes all the resources that it acquires (MoneySense, 2013).

5.2 Efficiency

As suggested by the Treasury Board guidance on “Assessing Program Resource Utilization When Evaluating Federal Programs” (TBS, 2013), we have undertaken an assessment of efficiency based on a cost–utility analysis. This method provides an assessment of program resource utilization in light of the program's worth.

DIF-H's allocative efficiency ratios are estimated by considering the lives saved that DIF-H has currently achieved (as presented in Section 4) over the costs of inputs. Given the possible range for lives saved, the evaluators' best estimates are used.

The total cost of DIF-H's inputs is based on the total amount spent by DIF-H. This scenario considers the current investments for the results achieved but does not consider the budget not yet spent (although this may be allocated). Since this figure should cover the total cost of DIF-H to the Government of Canada, we have included the total amount of funds engaged by GCC, including the research support activities, plus the DIF-H earmarked budgets for IDRC and CIHR. The additional funds provided by DFATD and the UK Department for International Development (DFID) have not been included.

This methodology has three main limitations:

1. **It considerably underestimates DIF-H's efficiency and cannot be used as an indication of per unit cost.** In reality, the total DIF-H budget was used to cumulatively achieve all the results claimed. However, it is not possible to sum all the different results achieved and apportion individual costs to each result. Instead, a commonly used strategy is to divide the number of each type of result by the total cost of the program. This is repeatedly done for each type of result. The problem with this approach is that it treats each result as if it were the only result achieved, when in reality all the results were achieved from the same pot of money. Accordingly, the total budget is counted many times. Therefore the efficiency figures cannot be used

¹⁵ Source: Compliance report, 2015.

to cost and budget for results, as this would imply a significant overestimation of the required budget. Rather the purpose is to provide a conceptual overview of efficiency.

2. **It does not include the real costs of the government’s investment in DIF-H.** This is because the budget allocations for CIHR and IDRC are likely to be underestimates of the true costs incurred by these institutions. However, there is no actual costing of the resources spent. Therefore, we considered the full budget allocation of each agency for DIF-H activities as the nearest proxy.
3. **It does not include future results from current investments.** For the purpose of this summative evaluation, and to respond to the Treasury Board criteria, the current efficiency ratio was estimated based on actual positive results achieved to date. Further results from current investments will be achieved in the future. Therefore, a more accurate estimation of efficiency requires an appraisal over a longer time period.

5.3 Allocative efficiency

Main messages: Allocative efficiency of DIF-H is acceptable, especially since more results from current investments will be achieved in the future. Findings of this evaluation provide benchmark data for future assessments of the DIF-H or similar programs.

If DIF-H has saved 8,689¹⁶ lives, the cost of DIF-H saving one life is \$18,487. The most efficient grand challenges in terms of cost per lives saved are the targeted challenges (\$7,589), then Stars (\$56,343), then TTS (\$228,421).

Defining the value of saving a life has been the subject of intractable debate. There is today no internationally recognized standard to measure this outcome. Different organizations, including GCC, are working on this question.

Regarding efficiency, however, international measures and benchmarks are available and, when used, make it possible to compare the efficiency cost of saving one life between different interventions or programs. Most economic appraisals use quality-adjusted life years (QALY) or disability-adjusted life years (DALY) as measures of health gains as a result of an intervention (Sassi, 2006). However, because GCC does not use these age-weighted measures, it makes it difficult to compare the allocative efficiency of DIF-H with other programs.

For example, below we present a number of benchmarks with which to compare DIF-H's cost of saving or improving a life. However, they are all based on the number of years of life that would be added by the intervention. By comparison, the metrics of lives saved and lives improved used by GCC only report the numbers of lives affected, not the number of years of life affected. For instance, and put crudely, if an intervention saved the life of a child with a high life expectancy, the number of QALYs would be high but the number of DIF-H lives saved would be one. Alternatively, if an intervention saved the life of an older person with a lower life expectancy, the number of QALYs would be lower, but the number of DIF-H lives saved would still be one. This makes any comparison very difficult, but generally one DIF-H life saved would normally be “worth” several QALYs. Therefore, GCC’s efficiency as

¹⁶ Source: GCC Strategy Roadmap

measured through lives saved and lives improved will appear worse than if it was measured in QALY terms.

Examples of international use of QALYs for estimation of an intervention's efficiency

The Public Health Agency of Canada (PHAC) has summarized the cost-effectiveness of a variety of prevention activities using QALYs (Public Health Agency of Canada, 2009):

Diabetes prevention (lifestyle modification)	\$1,100 to \$8,800 per QALY
Cancer screening (colorectal cancer)	\$4,500 to \$10,500 per QALY
Influenza vaccination (>50yrs age)	\$5,800 per QALY
Tobacco control (youth prevention)	\$260 to \$3,100 per QALY

Source: Public Health Agency of Canada

At first look, the cost of \$18,487 per life saved by DIF-H would seem quite high in comparison to the interventions costed by PHAC. However, this is because PHAC costs are per year of life saved, not per life saved. Therefore the cost efficiency of a DIF-H life saved may actually be better, presuming each person saved would live longer than a year.

In the UK, the National Institute for Clinical Excellence uses QALY to make its budgetary and prioritization decisions. The latter accepts a threshold incremental cost of C\$40,000 per QALY as being sufficiently cost-effective to justify UK National Health Service investment. Interventions with a marginal efficiency of between C\$40,000 and C\$60,000 should be considered if there are strong additional reasons. Although these figures relate to implementation in HICs, they would still indicate that a DIF-H life saved is cost-efficient.

Benchmarks are also available for LMICs. The World Bank (1993) derived a figure equivalent to C\$197 per DALY to recommend a minimum care package of services that should be provided by LMICs, and this threshold was reiterated in 1996 in an effort to define research priorities. C\$197 per DALY was specified as offering “attractive” cost-effectiveness and C\$33 per DALY as offering “highly attractive” cost-effectiveness for low-income countries, with C\$655 and C\$131 per DALY, respectively, specified for middle-income countries. On the basis of these assumptions, a DIF-H life saved is less cost-efficient. However, once again this will depend on how many years of life were saved by each DIF-H life saved.

To permit comparison and align with international benchmarks, GCC may like to consider using measures that better reflect age-weighted health gains (as with QALY and DALY), rather than just a global figure, such as lives saved. However, this will require additional data collection and detailed analyses, so may only be appropriate for periodic reviews, or a subset of projects/grand challenges.

5.4 Operational efficiency

Main message: Operational efficiency of DIF-H and GCC is good, but there is some room for improvement.

- Considering international benchmarks, DIF-H and GCC have been operationally efficient.
- GCC is currently running too lean and could further increase efficiency through deepening investments into its own operations.
- The DIF-H processes of launching RFPs, reviewing applications, and managing grants have been efficient for DIF-H, but may not be efficient for CIHR and IDRC.
- DIF-H internal knowledge management has been inefficient.

The investment in setting up DIF-H was initially high, but in the last two years operating costs have stabilized at around 10%. GCC estimates that its operating costs need to be 12% in order to be able to operate correctly. The evaluators agree that GCC is running too lean and suggest that GCC should increase its operational inputs to ensure that the quality and quantity of services required to deliver objectives are not compromised. In particular, it appears that GCC requires more staff, and particularly more specialized staff. In recognition of this, GCC has begun the process of recruiting additional staff and commissioning external specialists.

A study in *MoneySense* (2013) gives an A+ rating for efficiency to organizations in the international development space that spend less than 15% of their funds on operations. Following this benchmark GCC would receive an A+. Table 9 shows GCC's operational costs.

Table 9: Proportion of GCC's operational costs compared to grants given

	FY 09–10 Actuals	FY 10–11 Actuals	FY 11–12 Actuals	FY 12–13 Actuals	FY 13–14 Actuals	FY 14–15 Actuals
General administration	88%	66%	13%	4%	3%	3%
Program support	12%	24%	15%	5%	5%	7%
Research program	0%	10%	72%	91%	92%	90%

Source: GCC

'General administration' includes personnel, infrastructure, and business development for the administration and management staff (i.e., executive directors and some of the vice-presidents).

'Program support' includes personnel, infrastructure, and business development for the technical staff (i.e., some of the vice-presidents, portfolio managers, and all staff).

'Research program' includes the grants and the research support activities (i.e., networking, monitoring, support to innovators, etc.).

DIF-H's operational costs are higher because the set-up costs and the costs of IDRC and CIHR must be included. When these are added and averaged over the financial years, DIF-H's operating costs are approximately 15% or higher. This means that DIF-H would not receive an A+ for its operations, but it is still operationally efficient. DIF-H's operating costs are shown in Table 10.

Table 10: Operational costs of DIF-H in C\$

	FY 10–11 Actuals	FY 11–12 Actuals	FY 12–13 Actuals	FY 13–14 Actuals	FY 14–15 Actuals	Total
GCC	2,610,087	4,628,210	5,634,120	6,803,961	-	19,676,378
IDRC	900,000	900,000	900,000	900,000	900,000	4,500,000
CIHR	180,000	180,000	180,000	180,000	180,000	900,000
Total	1,080,000	5,708,210	6,714,120	7,883,961	1,080,000	25,076,378

Source: GCC

These data cover July 1, 2009 to March 31, 2011 and come from the IDRC record of actuals spent. The data are close to the GCC financial statements, but they do not match them exactly.

The details of IDRC's and CIHR's allocated expenditure cannot be tracked for the full DIF-H allocation. The total budget was therefore evenly split throughout the program life.

5.4.1 Efficiency of key DIF-H processes and activities

The grantee selection system, based on GCC initial screening of RFPs and CIHR peer review, is functioning and efficient, although CIHR's services are likely to have been undervalued. GCC has received 5,609 applications (2,960 for innovator-defined challenges and 2,649 for targeted challenges). CIHR prepared the peer-reviewed process, screened and scored more than 3,000 applications, and mobilized the highest level of Canadian and international researchers as peer reviewers.

Based on the CIHR budget allocation for DIF-H, CIHR received \$300 for each application reviewed and scored. By comparison, an evaluation of CIHR's Open Operating Grant Program found that "the cost per application includes: \$1,307 for direct and indirect administrative costs; [and] \$1,812 in peer reviewer time; ...Administrative costs are comparable with both NHMRC (\$1,022) and the US National Institutes of Health (\$1,893)" (CIHR, 2012a).

On this basis, the system of contracting CIHR to provide scientific rigour to DIF-H is efficient for DIF-H: it would have been more expensive if an external non-public institution had been hired for the same purpose. However, the investment is unlikely to have been efficient for CIHR considering the difference between the funding provided by the Government of Canada and the costs cited by the CIHR evaluation. Furthermore, CIHR invested significant time, effort, and transaction costs to understanding and implementing a peer review system with integrated innovation as a key selection criterion.

The project management system operated by GCC is functioning and efficient, although IDRC's services also seem to have been undervalued. IDRC's support has contributed to the development of a robust grant management system. This system enables low operational costs; it would have been more expensive to contract this support externally. However, the

investment may not have been efficient for IDRC, whose services and transaction costs in negotiating with the government seem to have been underestimated.

Although the individual consortium members have demonstrated learning, knowledge transfer between the consortium members has been limited. This cost of reinventing the wheel has reduced DIF-H's efficiency. The DIF-H consortium was built with institutions that each bring a unique and recognized excellence. The expertise of CIHR and IDRC were not always used by GCC when they were made available or offered. While this may have been appropriate in some circumstances, both the formative and summative evaluations consider that significant opportunities for knowledge transfer have been missed. Examples of a lack of knowledge transfer include:

- 1. Measuring innovation.** IDRC has more than 40 years of experience of monitoring and measuring the impact of research. Although IDRC provided GCC with support on monitoring and evaluation during DIF-H inception, GCC has been reluctant to accept further input from IDRC. This is in spite of the recommendations of the formative evaluation and the IDRC performance audit that found that GCC's project-level monitoring needed strengthening.
- 2. Local intelligence.** IDRC has four regional offices (India, Uruguay, Kenya, Egypt), including countries with a large number of GCC innovators such as Kenya and India. This local Canadian intelligence has not been leveraged for DIF-H purposes.
- 3. Integrated Knowledge Translation.** CIHR has been a leader in the theory and practice of knowledge translation, in particular Integrated Knowledge Translation (CIHR, 2012b¹⁷). Although the precise interpretation of Integrated Knowledge Translation differs from GCC's Integrated Innovation, the content is sufficiently similar to have been of use to DIF-H. The evaluation found that the concept of integrated innovation now seems to be well understood by GCC and CIHR, and is established within the peer review criteria. However, the process of coming to this common understanding has been long and challenging. More carefully considering CIHR's work on knowledge translation would have enabled the consortium to benefit from years of research, theory, and evidence-based practice already available.

5.5 Structure, governance and processes of DIF-H

A final consideration for Core Issue 5 is how DIF-H's structure, governance, and processes affect performance. DIF-H was not intended to be a "physical entity" with a board and a strategy but, rather, a consortium of three members with specific expertise to allow for the effective implementation of DIF-H and a mitigation of its risks.

Evaluation of the consortium model requires consideration of the evolution of the DIF-H context. When DIF-H was created in 2008, the consortium model was a novel delivery mechanism for the Government of Canada. A formative evaluation was conducted at the program's mid-life that provided evidence and lessons learned to support DIF-H performance. Now at the end of the first DIF-H funding cycle, seven years since inception,

¹⁷ The target audience for this guide is CIHR applicants and reviewers, but the concepts are transferable to a broader audience.

this summative evaluation presents a retrospective assessment of the consortium’s performance and considerations for the future.

Main message: Each DIF-H consortium member has performed its specified roles proficiently and as required. However, the governance of DIF-H needs further consideration.

- There is no specific DIF-H leadership, strategy, nor established board and governance structure for DIF-H as an entity. Instead, GCC delivers these functions through its board and organizational processes.
- While DIF-H is generally well run, there are risks associated with the program. The current governance mechanisms do not provide the government with a system to steer DIF-H activities. So the Government of Canada may be accountable for risks over which it has no control and, therefore, which it has limited ability to mitigate.
- There has been limited ongoing scientific input throughout project life cycles and in relation to more recent management decisions. This means that opportunities to scientifically steer program developments have been missed and the scientific rigour and safety of project implementation cannot be guaranteed.

5.5.1 DIF-H leadership and accountability

There is no specific DIF-H leadership nor established board and governance structure for DIF-H as an entity. In the absence of DIF-H leadership, GCC’s board and Chief Executive Officer have provided strong leadership to the organization, which guided DIF-H’s implementation from the outset. Throughout the life of the program, GCC’s board has been strong, and has been committed to all operational aspects of GCC. The board of directors comprises 14 members, including the presidents of IDRC and CIHR who, through their board seats, have a fiduciary duty to GCC.

The potential conflict of duty created by the dual roles for these directors, especially IDRC’s president, was raised in the formative evaluation. The summative evaluation found no evidence that the potential conflict of duties has caused any issues for GCC, and both IDRC and CIHR presidents have been recognized as excellent board members. Their commitment to GCC and strong support to the board has supported organizational strengthening and leadership.

As mandated by the Treasury Board, IDRC is responsible for ensuring the accountability of DIF-H to the Government of Canada.¹⁸ Considering the oversight mechanism used by IDRC for its other grantees and federal programs, DIF-H has been afforded an appropriate accountability mechanism to assess the program *ex post*, as demonstrated by the following IDRC-led activities:

1. Annual reporting to the Canadian government;
2. Quarterly reporting from GCC;
3. Formative and summative evaluations (2011, 2015), including a field visit to grantees in Peru as part of the summative evaluation;

¹⁸ IDRC governs the flow of funds for DIF-H. It is also responsible for ensuring the accountability of DIF-H to the Treasury Board of Canada.

4. A performance audit (November 2014); and
5. A field visit (Kenya, 2014).

However, the evaluators found that the consortium's decisions appear to have often been driven by power relationships both within and outside of the consortium. The evaluation concludes that IDRC's position in steering strategic dialogue needs to be revised, as the institution does not currently have the relevant tools and mechanisms to do this. The evaluation team also notes that this model has hindered IDRC's role in the provision of leadership in its areas of expertise, including evaluation, donor partnerships, and monitoring.

By extension, the DIF-H governance model does not enable the Government of Canada to take on an *ex ante* role in setting DIF-H priorities or effectively steering strategic dialogue. This means that, although accountability is provided to the Canadian government, stewardship by the government is not possible.

However, it is important to keep in mind that there is inevitably a trade-off between the government setting priorities for DIF-H and the need to protect GCC's independence and responsiveness, which in turn enables the transfer of innovation-funding related risks from the government to GCC.

5.5.2 DIF-H's strategy

The lack of a DIF-H strategy has reduced DIF-H's ability to effectively and proactively take advantage of opportunities for collaboration among the consortium members and other governmental agencies and initiatives.

With time, GCC has developed its own strategy, which has guided DIF-H implementation and resulted in a multitude of external partnerships. However, the strategic partnerships between DIF-H, its implementing arm, GCC, and other governmental agencies could have been enhanced with the guidance of a DIF-H strategy developed by the consortium; this would have represented consortium members going beyond their specific responsibilities to demonstrating an ownership of DIF-H.

5.5.3 DIF-H delivery

With respect to the duties assigned by the government, each DIF-H consortium member has performed its roles proficiently. However, the DIF-H model has not been able to address all the risks of its delivery. The main areas of concern are presented below.

5.5.3.1 Scientific excellence and rigour

The Government of Canada requires a guarantee that, through the DIF-H, it is funding excellent science. The Scientific Advisory Board helped ensure that DIF-H's initial strategy was driven by expert thinking and evidence, and CIHR ensured that DIF-H-funded projects were scientifically sound. However, there is limited ongoing scientific input, which means that opportunities to scientifically steer program developments and ensure continuing rigour and safety of project implementation have been missed.

In regard to the project proposals that CIHR was made responsible for reviewing, CIHR met its responsibilities to an excellent standard. However, CIHR was hindered in its peer review

by not having sole responsibility for the process. Conducting a peer review goes beyond reviewing the proposal; it starts from the outset by defining the selection criteria and finishes with the scoring and ranking of submissions. GCC was strongly involved in the definition of the selection criteria, and sometimes applied a first filter to the submissions before sending them to CIHR for peer review, occasionally pushing its own priorities when scoring and ranking submissions. It is understood that this was done in an effort to refine project selection so as to meet GCC needs; however, this interference resulted in significant transaction costs and risks for CIHR, and DIF-H's reputation. Notably, there was a potential loss of transparency and scientific integrity of the peer review process. It is important to note that these initial tensions have now been resolved and that the peer review system is functioning at a satisfactory level.

In addition to CIHR's scientific input, GCC created the Scientific Advisory Board (as mandated by the Treasury Board submission) to provide two key functions: to identify and endorse the selection of grand challenges, and to provide scientific oversight and leadership to GCC. To this end, GCC successfully leveraged the investment of time and effort from an exceptional array of internationally respected scientists. The Scientific Advisory Board minutes from 2011 and 2012 demonstrate excellent engagement from the outset in key areas of GCC strategic development, including the selection of grand challenges, the scaling of innovation, and the move toward social financing.

However, in 2013 a decision was taken for the Scientific Advisory Board to work through subcommittees to undertake detailed portfolio reviews of each grand challenge. Although GCC argues that this structural change supports greater efficiency, it is not clearly articulated in the minutes, and some Scientific Advisory Board members reported a lack of clarity about their roles and responsibilities with regard to the full board, compared with the subcommittees.

Regardless of the relative merits of this decision for the portfolio review process, the Scientific Advisory Board no longer operated its leadership functions with the same level of engagement. Accordingly, opportunities were missed for engagement with the strategic direction of GCC and DIF-H (as opposed to the operational work of the individual grand challenges). For example, the full Scientific Advisory Board would have been well placed to support the validation of the methodology for outcome claims but it did not engage meaningfully in this area as it was not formally meeting during the critical time when this methodology was being developed. The formative evaluation of DIF-H also made observations regarding the lack of clarity of the Scientific Advisory Board's role and issues of underperformance;¹⁹ the findings of this summative evaluation show that these concerns have still not been fully addressed.

¹⁹ Other issues for improvement relating to the Scientific Advisory Board, contained in the formative evaluation, included:

- a) Lack of clarity about the role of the Scientific Advisory Board and involvement of the Scientific Advisory Board members;
- b) Lack of participation of the Scientific Advisory Board in setting the research priorities for GCC;
- c) Need for clear terms of reference and membership eligibility;
- d) Concerns about sufficient information being fed to the Scientific Advisory Board, particularly relating to the response to, and update of, the Scientific Advisory Board recommendations;
- e) Challenges because of the distance between members — suggestions include having a face-to-face meeting once a year and making use of video conferencing to improve connection of the Scientific Advisory Board members;
- f) Lack of engagement outside of board meetings — suggested that Scientific Advisory Board members would benefit from more frequent information, communication, and feedback.

However, GCC has recently strengthened ongoing scientific input into its targeted challenge projects through the use of specialist external support teams known as platforms. Projects that are transitioning to scale also undergo re-appraisal from a business as well as scientific perspective. These new mechanisms certainly represent important progress. However, at the time of the evaluation, business and scientific platforms were still finding their feet and Stars projects were not receiving ongoing oversight beyond reporting outcomes to GCC project officers. While this reporting function is important, it cannot guarantee the rigour and safety of Stars projects' implementation. This is discussed further below.

5.5.3.2 Identification and mitigation of risks

GCC has developed a strong and efficient operational risk identification and mitigation system. A detailed risk matrix has been developed and a GCC vice-president is responsible for its updating and revisions, and mitigating risks when they arise. An escalation system is in place and key risks are reported quarterly to the GCC board. The evaluation team found that the system is active, has proven to be effective in different instances, and should be kept in the future.

However, GCC-funded projects could pose potential risks to health systems in countries where they are implemented, and the current risk management system does not include a rigorous due diligence system for identifying project-related health systems risks. Such risks should be screened for and reviewed by a tailored due diligence process, to ensure that such projects are appropriate investments for the Canadian government. With few exceptions, GCC does not have in-country intelligence that can be used when assessing and monitoring its projects. The RFP selection criteria are the only guarantees that a project will, at the minimum, do no harm. While some reviewers have picked up on potentially harmful projects, this is not an explicit requirement. Examples that the evaluators consider to require ongoing due diligence include projects related to innovative health monitoring information systems that enable health staff to stop inputting data into national health management information systems; support to innovative health financing mechanisms, such as vouchers for health care; and provision of remote medical training for Caesarean sections.

The Scientific Advisory Board does review the outcomes of the top performing projects, but it is afforded insufficient time and data to interrogate project activities more closely, and it cannot be expected to do this for all projects. Therefore a more systematic, yet efficient, mechanism for identifying and addressing project-related risks is needed.

5.5.3.3 Operations

When the Treasury Board created DIF-H and GCC as its implementation arm, the Government of Canada considered the operational risks of this new program to be significant and established the DIF-H consortium as a mitigation strategy.

As per the memorandum of understanding, IDRC was made responsible for helping GCC to get off the ground, designing all of its internal systems and the challenge fund mechanism and procedures. Accordingly, IDRC ranked GCC as a high-risk grantee. The support provided by IDRC was valued by all consortium members and was recognized as a key enabler of GCC becoming an efficient challenge fund and grant manager. GCC is now regarded by IDRC to have performed well as a grantee, with relevant robust systems and procedures in place. This was confirmed in the last GCC external audit conducted by Ernst

and Young, where no comments were made otherwise. Owing to these successes, it may now be time to review the requirement that IDRC provide technical support to GCC.

5.5.3.4 Public accountability

DIF-H has no external communication or branding. GCC has filled this gap and invested in communication that ensures recognition is given to the Canadian government. While this brands the Government of Canada by associating its name with GCC activities, this poses reputational risks for the government.

GCC brands its actions and activities as Government of Canada actions and activities, as mandated in the Treasury Board submission. The evaluators can confirm that it is widely known that GCC is funded through Canadian taxpayer dollars. However, the Government of Canada has no control or oversight over GCC's strategy, only an *ex post* audit and evaluation role implemented through IDRC. As mentioned previously, this does not provide an adequate leadership framework for IDRC or the Government of Canada.

Additionally, this approach makes the Government of Canada appear to be the sole entity responsible for GCC's financial sustainability. With this branding approach, if the government were to discontinue funding DIF-H, and this resulted in the termination of GCC operations, the Government of Canada would be considered solely responsible.

Conclusions and recommendations

The evaluation evidence presented in this report supports the following conclusions and recommendations.

Overall conclusion: The Government of Canada’s investment in DIF-H provides value for money.

Relevance conclusion

The Development Innovation Fund – Health is a highly relevant investment for the Government of Canada.

DIF-H addresses demonstrable needs for Canadians and the international community. These needs include the continuing requirement for financing to support innovations in global health, resolving barriers to global health and safety, and promoting development and equity in LMICs. The alignment of DIF-H with several of the contemporary Sustainable Development Goals highlights this. Innovation is also recognized as a relevant and cost-effective way to address global health challenges, and investment in DIF-H has contributed to positioning Canada at the forefront of international efforts to rethink development modalities. DIF-H also provides Canadian innovators with increased opportunities to engage with LMIC innovators and research institutions. Furthermore, the Canadian public values this national support to international development and global health, as it recognizes the potential dangers of global health risks.

DIF-H is well aligned with the Government of Canada’s thematic priorities in global health, development, and innovation. Within global health, DIF-H activities closely align with priorities for Canadian ODA and, particularly, maternal, neonatal, and child health. Regarding development and innovation, the DIF-H funding modality has strong complementarity with other governmental agencies’ innovation strategies, both domestic and international. Although there is only partial geographical alignment with ODA focus countries, positive impacts arising from DIF-H can be applied to these countries in due course.

DIF-H also offers a valuable contribution to Canada’s diplomatic agenda, and GCC has established an impressive set of formal and informal international partnerships and networks. Nevertheless, DIF-H would benefit from a clearer strategic vision for coordinating with, and working alongside, other governmental development initiatives.

Although a thorough interrogation of alternative mechanisms for DIF-H was not conducted during an inception period, the consortium mechanism for DIF-H was relevant for the management of an innovation fund and as a funding delivery vehicle. The decision to create GCC as a new organization was appropriate and remains valid at the present time.

Performance conclusion

Reasonable expectations of outcomes have been achieved or exceeded. These outcomes have been produced with appropriate regard to economy, acceptable levels of allocative efficiency, and good levels of operational efficiency. While the structure, governance, and processes of DIF-H were largely

effective, there remain opportunities for improvement, and the governance of DIF-H requires further consideration in light of program developments.

Although it is not possible to assign an exact figure due to methodological and data limitations, the projects funded through DIF-H have resulted in relatively high numbers of lives saved; lives improved; beneficiary access to health products and services; and positive impacts on health policies, training practices, and health systems in LMICs. Importantly, more results can be expected in the future as current investments mature and reap further health gains.

This has been achieved through the development of a large number of innovative prototypes and service delivery models, a good proportion of which are being scaled up. These projects have also resulted in a commendable number of publications, patents, and patents pending. DIF-H grants have also contributed to increased jobs and funding to address global health challenges through innovation, especially given GCC's effective leveraging of funds.

In several cases, the consortium members went above and beyond the activities expected of them. Most notably, GCC's efforts at promoting grantee networking and capacity building, and developing partnerships with other international governments and organizations, should be applauded. The requirement that DIF-H should increase knowledge and awareness of a positive international Canada brand has been met.

Overall, the principles underlying the DIF-H theory of change appear to be well founded. This has arguably contributed to the successful achievement of results observed and is testament to the early and ongoing efforts of GCC and IDRC in developing the program theory.

Despite these achievements, lack of transparency when calculating results and inconsistencies in the reporting of outcomes damages the credibility of claims by allowing skepticism of genuine results. To remedy this, the evaluators recommend that GCC undertake a comprehensive review of its monitoring and reporting arrangements. Although it is acceptable to only report the results from top performing projects for promotional purposes, this should not preclude systematic monitoring of all projects and the provision of sufficient information for external parties to critically assess claims. These basic principles of rigour will serve to build trust in the results achieved and to facilitate knowledge sharing that will benefit the wider innovation for development community.

Cost–utility analysis reveals that DIF-H has been economical, allocative efficiency is acceptable, and operational efficiency is good. If predicted future results from current investments could be included, efficiency would be even better.

However, the evaluation team concludes that GCC is currently running too lean and could further increase efficiency through deepening investments into its own operations. Particular areas of opportunity include monitoring and evaluation and hiring specialist staff. Furthermore, some of the DIF-H economies may not actually be net savings for the Government of Canada, because the services provided by CIHR and IDRC appear to have been undervalued. The exact funding shortfall incurred by these organizations due to insufficient government funding allocation is unknown because resource outputs assigned to DIF-H were not tracked.

At this stage, it is not possible to assess if DIF-H is more or less efficient than other government investments in global health because more time is required for the final outcomes of DIF-H investments to become apparent; GCC uses different metrics from international norms of efficiency,

which makes efficiency comparisons difficult; and no benchmarks have been established for GCC metrics (e.g., lives saved or lives improved). While the summative evaluation provides benchmark data for future assessments of the DIF-H or similar programs, using efficiency measures that better reflect age-weighted health gains (as with QALY and DALY), rather than just a global figure, would enable international comparisons.

DIF-H's structure, governance, and processes have, on the whole, served the program well. All consortium members have performed their roles and responsibilities proficiently, added value and unique expertise, and contributed to the achievement of results. The contribution of internal and external committees, institutions, and stakeholders has leveraged critical support and brought in the necessary expertise, as required.

However, there has been limited ongoing scientific input throughout project life cycles and in relation to more recent management decisions. This means that opportunities to scientifically steer program developments have been missed and the scientific rigour and safety of project implementation cannot be guaranteed.

Furthermore, the choice to not establish a specific entity to operate DIF-H, and defer all leadership, strategy, and operational decisions to the GCC board opens the Government of Canada up to risks that are beyond its control to mitigate. Importantly this structural set-up reduces IDRC's mechanisms for strategic direction, even though it is the agent that is accountable to the government.

Future considerations

Moving forward, there are multiple options open to the Government of Canada, each having certain advantages and disadvantages.

If the government is interested in continuing to fund global health innovations, this second phase of support must address the following issues:

1. How much the government wants to continue supporting challenge funds for innovation, and if the fund should continue to be solely allocated to the health sector or be expanded and/or focused on other sectors;
2. How much the government wants to keep the same delivery modality, in which case the current consortium modality needs to be revisited in light of the findings of this evaluation and the maturity of a now well-established GCC.

If further investment is allocated to DIF-H in its current form, a key consideration will be determining the extent to which the Government of Canada wishes to steer the strategic direction of these funds. As GCC becomes increasingly externally financed and its accountabilities diversify, the Canadian government's stewardship influence will be weakened. However, increasing government control risks undermining the purposes for which GCC was created (independence, flexibility, and responsiveness) and could even have negative impacts on GCC and grantee performance.

Recommendations

Regardless of the future form that DIF-H takes, the following recommendations should be considered to improve program relevance and performance.

Recommendation 1: Better strategy. DIF-H should develop an applied and dynamic, consortium-level strategy for outlining coordination with Canadian aid and other governmental initiatives in global health and development. A DIF-H strategy should also formalize expected visibility arrangements and improve internal knowledge transfer and cooperation between consortium members. The same is recommended of any DIF endeavour into other fields of innovation (e.g., environment, agriculture, education, etc.).

Recommendation 2: Strengthen scientific oversight. Although CIHR peer review ensures that funded projects are scientifically rigorous at their earliest stages, there are few mechanisms to ensure that scientific standards of projects are maintained post-implementation. Mechanisms should be put in place to guarantee the scientific integrity of funded projects throughout their life cycle. While the Scientific Advisory Board does review the outcomes of the top performing projects, it is afforded insufficient time and data, and it lacks sufficient resources and mandate to do this for all projects. Therefore a more systematic, but efficient, mechanism is needed. GCC's formation of specialist platforms to support the targeted challenge and Transition to Scale grand challenges are a step in the right direction, but GCC should pay greater attention to the Stars projects.

The decision that the Scientific Advisory Board should work through subcommittees has resulted in reduced scientific leadership and input. Accordingly, opportunities were missed for engagement with the strategic direction of GCC and DIF-H (as opposed to the operational work of the individual grand challenges). DIF-H must consider these implications and work to ensure that management decisions continue to be supported by expert scientific thinking

Recommendation 3: Optimize metrics. The results indicators used by GCC require further refinement to make them more precise and objective. Adopting international measures of efficacy that better reflect age-weighted health gains would also enable international comparisons of efficiency. The evaluators appreciate that there are advantages and limitations of different measurement methodologies, but the use of common metrics and benchmarks could help facilitate reporting, and form the basis for target setting.

Recommendation 4: More rigorous monitoring and reporting. GCC should undertake a comprehensive review of its monitoring and reporting arrangements. These need to be more systematic, transparent, and consistent, so as to balance the externally facing promotional approach with the need for scientific rigour. To ensure credibility, there should be an audit trail connecting raw data to final results claims.

Recommendation 5: Seize efficiency opportunities. GCC is an efficient organization. However, further operational investment would increase efficiency to a greater extent and avoid the risk of underperformance. Although this represents a trade-off with cost minimization, investment in areas such as more comprehensive monitoring and additional specialist staff could improve results and reporting that will balance the allocative efficiency ratio of inputs to outcomes—in simpler terms, doing more with more.

DIF-H should review the funds allocated to IDRC and CIHR to ensure that they cover the actual costs incurred in providing services to DIF-H. This allocation should be based on an estimation of previous resource use. Future resources provided to DIF-H should be tracked to prevent under- or over-allocations.

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Annexes

A. Evaluation management plan

Development Innovation Fund – Health

Evaluation Management Plan

December 4th 2014

1) Purpose of the Evaluation Management Plan

This document provides over-arching principles for the International Development Research Centre's (IDRC) management of the 2014-2015 summative evaluation of the Development Innovation Fund – Health (DIF-H). The parameters and guidance provided herein shall be applied by the IDRC, Grand Challenges Canada (GCC), and the Canadian Institutes of Health Research (CIHR) with a view to providing an independent, accountability-focused assessment of the DIF-H.

Responsibility for the management of the evaluation of the DIF-H was directed to the IDRC by the Treasury Board Secretariat of Canada (TBS) through Memorandum to Cabinet.

It is noted that GCC will convene an International Peer Review exercise along similar timelines as the summative evaluation. This document does not preclude the management approach GCC applies to that independent process.

2) Summative Evaluation of The Development Innovation Fund – Health

The Government of Canada established the Development Innovation Fund (DIF) in 2008. As announced in that year's federal budget, the Fund aims to

'... support the best minds in the world as they search for breakthroughs in global health and other areas that have the potential to bring about enduring changes in the lives of millions of people in poor countries.'

A three-party consortium implements the DIF-H. It includes IDRC, CIHR, and GCC. Further details on the DIF-H are available on the websites of each implementing agency.

The Memorandum to Cabinet establishing the DIF-H called for a return to Cabinet following a formative evaluation of the DIF in year 3 and prior to funding being renewed beyond the initial phase. The formative evaluation was completed in the fall of 2013; however, it did not provide enough information for Ministers to base a renewal decision. The MC also called for a return to Cabinet following the completion of a summative evaluation 'to assess research results'.

3) Guiding principles of the evaluation

The evaluation of the DIF-H shall be designed, conducted, and managed with adherence to the following guiding principles:

Credibility of the process and results, through adherence to the Guidelines of Ethical Conduct of CES

Independence of the evaluation team

Transparency in content and process

Fairness towards all relevant stakeholders

Efficiency in the use of resources

Evaluation governance

Independent Inquiry

The assurance of independent inquiry is a theme of evaluation governance. To support this, an external and independent evaluator(s) will be commissioned to conduct the evaluation of the DIF-H. An external assessment is an accepted best practice when seeking to mitigate the risk of internal interference and can be a method of increasing the credibility of the evaluation findings.

Although the IDRC has been specifically directed to manage the evaluation function of the DIF-H, and therefore any external evaluator(s) hired to conduct related activities, an oversight structure will be initiated to support the IDRC in its evaluation management role. This oversight structure is designed to uphold an independent and transparent process. The structure will be comprised of two discrete committees:

1 - The DIF-H Evaluation Committee is charged with regular discussion of issues pertinent to the evaluation. It is chaired by the Evaluation Office of the IDRC and is composed of senior level representatives of each consortium member - IDRC, GCC, CIHR. The DIF-H Evaluation committee will meet at a minimum of four critical check-in points. These are:

- 1) **At evaluation initiation**, to discuss the management approach and committee roles and responsibilities – notional date in January 2014;
- 2) **At the evaluation planning stage**, to discuss the evaluation approach presented by the independent evaluator(s) – notional date in March 2015;
- 3) **At a preliminary findings stage**, to respond first hand to evaluation findings prior to report publication – notional date in July 2015;
- 4) **At evaluation conclusion**, to contribute to the management response, to be written by IDRC, responding to the recommendations of the evaluation – notional date, September/October 2015.

(Following nominations by the Head of each consortium member, this Committee is comprised of: Jocelyn Mackie, Vice-President, GCC; David Peckham, Director General, CIHR; and Robert McLean, Senior Program Specialist, IDRC. The Chair is Lisa Woodward, Head of Evaluation, IDRC.)

2 - The DIF-H Evaluation External Oversight Committee is charged with making decisions by consensus on critical evaluation issues. It is comprised of three external subject area experts who are deemed to be independent of any consortium member, and in addition, it may include one ex-officio representative of the Government of Canada with significant expertise in Evaluation. The committee is convened by the Evaluation Office of the IDRC. The committee shall convene at a minimum of three critical decision points. These are:

- 1) **To select the evaluator(s)**. By reviewing applications and applying their expert judgement against the criteria of evaluator(s) experience as well as feasibility and rigour of approach.
- 2) **To approve the evaluation design report**. Based on the evaluator(s)' proposed design and discussion by the DIF-H Evaluation Committee, the committee will draw upon their expertise in approving the design of the evaluation.
- 3) **To approve the final evaluation report**. Upon conclusion of the evaluation the final report will require approval of the External Oversight Committee. The committee will draw upon their expertise to apply the Guiding Principles of the Evaluation in approving the final evaluation report.

(Following nominations by the Head of each consortium member, a collaborative cross-consortium ruling on independence of each candidate, and a signed statement of independence by each nominee, this Committee is comprised of: Katie Wehr, Program Officer, Robert Wood Johnson

Foundation (GCC nominee); Kathryn Graham, Executive Director Performance Management and Evaluation, Alberta Innovates Health Solutions (CIHR nominee); and François Dumaine, Partner, PRA Inc. (IDRC nominee). The Chair is Lisa Woodward, Head of Evaluation, IDRC.)

Rigorous inquiry

A second theme of evaluation governance is the assurance of rigorous inquiry. To support this theme while meeting the needs of evaluation users, evaluation questions will be created drawing upon guidance provided by the TBS *Policy on Evaluation* (2009) core issues as well as the input of DIF-H consortium members. The selected evaluator(s) shall apply a contextually appropriate and scientifically advanced methodology to answer evaluation questions. The creation of clear, accountability-oriented evaluation questions and the application of a robust methodology will bolster the accuracy and credibility of evaluation findings, and therefore, the pertinence of associated recommendations.

4) Evaluation schedule

The evaluation shall be conducted along the following schedule:

- Convening of the DIF-H Evaluation Committee and DIF-H External Oversight Committees – **December 2014**
- Selection of evaluator(s) – **January 2015**
- Evaluation Design Plan – **March 2015**
- Preliminary findings presentation – **July 2015**
- Final evaluation report – **September 2015**
- Management response – **October 2015**

5) Evaluation resources

Given the requirement for external assessment, the budget shall be managed by the IDRC and dispersed to the selected evaluator(s) on a pay for deliverable basis.

B. Evaluation matrix

Core Issue	Issue#	High-level questions to be answered	Indicators	Data sources	Methods
1. Continued need for the program	1.1	Does DIF-H address a demonstrable need, and has it evolved to meet emergent needs?	The degree of agreement regarding the view that mobilizing and enabling Canadian and international innovators to develop innovative solutions to critical global health challenges, and facilitating the implementation and commercialization of these solutions, can improve global health outcomes in LMICs	Published and grey literature from respected international organizations and documents provided by GCC	Literature review
				GCC Expert Panel member discussions	Consider findings/conclusions
				Board of directors	Key informant interviews (KIIs)
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				CIHR senior management involved with DIF-H	KIIs
				Global donors operating in similar sectors	KIIs
				Other grand challenge family members	KIIs
				Organizations operating in health innovation sectors	KIIs
				Government of Canada	KIIs
			Other subject matter experts	KIIs	
			The degree of alignment between the global health issues addressed by DIF-H and international priorities and expert thinking on global health needs	Published and grey literature from respected international organizations and documents provided by GCC	Literature review
				GCC Expert Panel member discussions	Consider findings/conclusions
				Board of directors	KIIs
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				Global donors operating in similar sectors	KIIs

			The degree of agreement regarding the view that DIF-H's approaches are appropriate for enabling and mobilizing Canadian and Southern scientists to develop innovations, and to facilitate the implementation and commercialization of the innovations, and that DIF-H has evolved to meet emergent needs	Other grand challenge family members	KIIs
				Government of Canada	KIIs
				Other subject matter experts	KIIs
				Published and grey literature from respected international organizations and documents provided by GCC	Literature review
				GCC Expert Panel member discussions	Consider findings/conclusions
				GCC Scientific Advisory Board	KIIs
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				CIHR senior management involved with DIF-H	KIIs
				Other grand challenge family members	KIIs
	Organizations operating in health innovation sectors	KIIs			
	Canadian and international grant recipients, local stakeholders in and beneficiaries of GCC projects, local grand challenge family implementers	Surveys and case studies			
	1.2	Is DIF-H responsive to the needs of Canadians?	The degree of agreement regarding the view that mobilizing and enabling Canadian innovators is important for Canadians and meets their needs	Published and grey literature on relevant domestic issues, including governmental documents and resources, and documents provided by GCC	Literature review
				GCC Expert Panel member discussions	Consider findings/conclusions
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				CIHR senior management involved with DIF-H	KIIs
Government of Canada				KIIs	
Canadian grant recipients				Surveys and case studies	

2. Alignment with Government priorities	2.1	Are DIF-H's objectives of supporting innovations in global health aligned with the Government of Canada's priorities?	The degree of alignment between DIF-H's strategic objectives and government's priorities, focusing on objectives relating to: overcoming global health challenges; developing, implementing and commercializing health innovations; enabling and mobilizing Canadian and Southern scientists; and establishing Canada as a key player in global health	Governmental documents, and resources and documents provided by GCC	Literature review
				Board of directors	KIIs
				IDRC senior management involved with DIF-H	KIIs
				GCC senior management	KIIs
				Relevant IDRC departmental directors	FGDs
				Government of Canada	KIIs
				Other subject matter experts	KIIs
	2.2	Do DIF-H's objectives complement and reinforce Canadian international aid and ODA strategic outcomes?	The degree of agreement regarding the view that DIF-H and GCC strategic objectives complement and reinforce Canadian international aid and ODA commitments, focusing on objectives relating to: overcoming global health challenges; developing, implementing and commercializing health innovations; enabling and mobilizing Canadian and southern scientists; establishing Canada as a key player in global health; engaging strategic partners (capital investment for global health and other grand challenge partners); and exploring ways to finance health innovation	Governmental documents, and resources and documents provided by GCC	Literature review
				Board of directors	KIIs
				IDRC senior management involved with DIF-H	KIIs
GCC senior management				KIIs	
Government of Canada				KIIs	
3. Alignment with federal roles and responsibilities	3.1	To what extent is DIF-H aligned with federal roles and responsibilities? And is DIF-H an appropriate modality for supporting these federal roles and responsibilities?	The degree of alignment between DIF-H and federal roles and responsibilities; the degree of agreement regarding the view that DIF-H is an appropriate modality for supporting these federal roles and responsibilities	Governmental documents and documents provided by GCC	Literature review
				Board of directors	KIIs
				IDRC senior management involved with DIF-H	KIIs
				GCC senior management	KIIs
				Government of Canada	KIIs
	3.2	How is DIF-H aligned with other	The degree of alignment between DIF-H's strategic objectives and	Governmental documents and documents provided by GCC	Literature review

		provincial roles and responsibilities, and does it help the Government of Canada to deliver these mandates?	provincial roles and responsibilities, and the degree of agreement regarding the view that DIF-H helps the Government to deliver on these mandates	IDRC senior management involved with DIF-H	KIIs
				Government of Canada	KIIs
4. Achievement of expected outcomes	4.1	Were appropriate and useful performance targets, expected outcomes, and milestones set and adapted as necessary?	A clear list of unambiguous performance targets, expected outcomes and milestones set at the outset of the initiative; targets, expected outcomes and milestones are agreed upon by all parties and are seen as appropriate, feasible and useful; targets, outcomes and milestones are adjusted in alignment with program development; the adjustment of targets, expected outcomes and milestones is seen as appropriate and adding value	DIF-H (including GCC, IDRC and CIHR) program documents	Document review
				Board of directors	KIIs
				Scientific Advisory Board	KIIs
				Formative evaluation team lead	KIIs
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				Canadian and international grant recipients, and declined grant recipients	Surveys and case studies
	4.2	How many grand challenges and competitions were launched and did this process result in applications that met DIF-H requirements and were aligned with DIF-H objectives? To what extent was this process transparent, clear, fair and inclusive?	The number of grand challenges launched; the number of calls and RFPs per grand challenge; the number of applications per RFP; the number of, and diversity of, applicants from HICs, LMICs, and partnerships; the number of applications from applicants with limited capacity; the quality of applications; the transparency, clarity, fairness and inclusiveness of RFPs; the extent to which these outputs met targets and attracted the desired profile of applicants and project proposals	RFP documents	Document review
				CIHR review documentation and reports	Document review
				GCC review documentation and reports	Document review
				GCC and CIHR monitoring/reporting data	Data review
				CIHR individuals involved in review	KIIs
				GCC senior management	KIIs
				Canadian and international grant recipients, and declined grant recipients	Surveys and case studies
	4.3	How many grants were given and did this process result in grantees and	The number of grants given for each RFP; the value of grants; the number of grants awarded compared to applications for each RFP; the	GCC portfolio documents and database	Document and data review
CIHR review documentation and reports				Document review	
GCC review documentation and reports				Document review	

		<p>projects that met DIF-H requirements and were aligned with DIF-H’s objectives? To what extent was this process transparent, clear, fair and inclusive?</p>	<p>number of grantees funded for each grand challenge; the number of, and diversity of, grantees from HICs, LMICs, and partnerships; the number of grantees with limited capacity; the transparency, clarity, fairness and inclusiveness of the decision-making process; the degree of agreement in the decision-making process; the level of feedback provided to applicants; the extent to which the funded projects met targets and attracted the desired profile of grantees and projects</p>	GCC and CIHR monitoring/reporting data	Data review
				CIHR individuals involved in review	KIIs
				Scientific Advisory Board	KIIs
				GCC senior management	KIIs
				Canadian and international grant recipients	Surveys and case studies
	4.4	<p>What proof-of-concept knowledge was created, and did this portfolio of proof-of-concept knowledge meet DIF-H’s requirements in terms of supporting the achievement of its stated objectives?</p>	<p>The percentage and number of projects leading to proof-of-concept knowledge; the number of publications/presentations/citations arising from proof-of-concept knowledge; the extent to which the proof-of-concept knowledge met targets and created the required portfolio of knowledge products for each grand challenge</p>	GCC portfolio documents and database	Document and data review
				GCC monitoring/reporting data	Data review
				Scientific Advisory Board	KIIs
				Investment Committee	KIIs
				GCC senior management	KIIs
	Canadian and international grant recipients, local stakeholders and beneficiaries of GCC projects, local grand challenge family implementers	Surveys and case studies			
	4.5	<p>What business and social innovations have been developed and implemented and do these products, services and models meet DIF-H’s requirements in terms of supporting the achievement of stated objectives?</p>	<p>The number of proof-of-concept knowledge products translated into implementable products/services per RFP and grand challenge; the percentage of projects that led to implementable products/services; the number of patents or intellectual property items filed/secured; new models for private investment developed; the number of public and private entities engaged and the amount of funding leveraged; grand</p>	GCC portfolio documents and database	Document and data review
				GCC monitoring/reporting data	Data review
				Scientific Advisory Board	KIIs
				Investment Committee	KIIs
Canadian and international grant recipients, local stakeholders and beneficiaries of GCC projects, local grand challenge family implementers				Surveys and case studies	

			challenge-specific organizations / communities/ partnerships created or supported; the extent to which these products, services, models and financing met targets and created the required portfolio of business and social innovations to support DIF-H's objectives		
4.6	How many innovations have been scaled, adopted and used, and what are the implications of achieved and future scaling, adoption and use? Do these outcomes support DIF-H's objectives?	The number of innovations scaled per RFP and grand challenge; the percentage of innovations that have been scaled; the amount of debate regarding, and the testing, adoption and usage of, innovations; the extent to which these scaled products, services and models met targets and supported DIF-H's objectives		GCC portfolio documents and database	Document and data review
				GCC monitoring/reporting data	Data review
				GCC program officers and portfolio managers	FGDs
				Scientific Advisory Board	KIIs
				Investment Committee	KIIs
				Canadian and international grant recipients, local stakeholders and beneficiaries of GCC projects, local grand challenge family implementers	Surveys and case studies
4.7	What health, economic and social benefits have been achieved and what potential is there for future gains, in terms of lives saved and improved in LMICs? Do these outcomes support DIF-H's objectives?	The number of lives saved and improved in LMICs per grand challenge; the number of lives saved and improved for each successfully implemented and scaled innovation; the potential for further gains in lives saved and improved from currently implemented innovations and innovations in the pipeline; the expected timeline to impact for potential future gains; the lives saved and improved disaggregated by projected versus observable gains; the validity of projected gains; the extent to which these outcomes met targets and supported DIF-H's objectives		GCC portfolio documents and database	Document and data review
				GCC monitoring/reporting data	Data review
				IDRC individuals involved in monitoring GCC performance	KIIs
				GCC Expert Panel member discussions	Consider findings/conclusions
				Scientific Advisory Board	KIIs
				GCC senior management	KIIs
				Canadian and international grant recipients, local stakeholders and beneficiaries of GCC projects, local grand challenge family implementers	Surveys and case studies
				Global donors in similar sectors;	KIIs
				Grand challenge family members	KII

	4.8	Have Canadian and Southern scientists been mobilized and enabled to address global health challenges and develop innovative solutions to critical health bottlenecks in LMICs?	Increase in DIF-H grantees' capacity to address global health challenges, as indicated by: their improved knowledge and ability to undertake health innovation work and secure funding; an increase in the number of their publications; their generation of new knowledge and products; their career progression; and their access to supportive partnerships and collaboration. Also, the number of projects funded that involved collaboration and partnership; the number of grand challenge-targeted models and networks created and supported; the perceived increase in opportunities to address global health challenges through innovation	GCC portfolio documents and database	Document and data review
				GCC monitoring/reporting data	Data review
				GCC program officers and portfolio managers	Focus group discussions (FGDs)
				GCC Expert Panel member discussions	Review findings/conclusions
				Scientific Advisory Board	KIIs
				Canadian and international grant recipients, and declined grant recipients, local stakeholders and beneficiaries of GCC projects, local grand challenge family implementers	Surveys and case studies
				Subject matter experts: global donors in similar sectors; grand challenge family members; organizations operating in health innovation sector	KIIs
	4.9	Has DIF-H helped brand Canada as a thought leader in innovation and financing to address global health challenges?	The degree of agreement regarding the view that DIF-H has created a positive brand for Canada as a thought leader in innovation and financing for global health; the number of countries adopting the GCC approach	Published and social media material on DIF-H and GCC, and documents provided by GCC	Literature review
				GCC Expert Panel member discussions	Review findings/conclusions
				Board of directors	KIIs
				GCC senior management	KIIs
				Global donors operating in similar sectors	KIIs
				Other grand challenge family members	KIIs
				Organizations operating in health innovation sectors	KIIs
Government of Canada	KIIs				
Canadian and international grant recipients, declined grant recipients, local stakeholders and beneficiaries of GCC projects, local grand challenge family implementers	Surveys and case studies				
Other subject matter experts	KIIs				

5. Demonstration of efficiency and economy	5.1	Does DIF-H's allocative efficiency appear reasonable and justifiable considering the current and future outcomes?	Overall financial inputs to DIF-H in relation to currently observed outcomes: financial cost per innovation developed; financial cost per innovation scaled and made available; and financial cost per life saved and improved, <i>as claimed by GCC</i> . Also, the financial inputs to projects that have claimed health, economic and social benefits; outcome targets are clearly defined; clear mechanisms are in place to monitor inputs, outputs and outcomes; risk mitigation strategies are in place; evidence that actions have been undertaken to reduce resource consumption and maximize outcomes—in particular, appropriate management and support for funded projects; evidence of program learning and action—in particular, identification and appropriate termination of failing projects	DIF-H administrative and financial data	Data review
				GCC and IDRC monitoring and reporting data and documents	Data and document review
				Board of directors	KIIs
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				IDRC personnel involved with monitoring	KIIs
	5.2	Does DIF-H's operational efficiency appear reasonable and justifiable considering the program results achieved?	Overall and GCC proportion of funds spent on administration and operations compared to grants given; quality, quantity, timeliness and appropriateness of key targets; funding dispersed to GCC; grand challenges identified and competitions launched; peer review of applications; grants given; program monitoring and learning. Evidence that actions have been undertaken to improve operational efficiency	Canadian and international grant recipients, and local stakeholders and beneficiaries of GCC projects	Surveys and case studies
				Literature on the operational efficiency of other programs	Literature and data review
				DIF-H administrative and financial data	Data review
				GCC and IDRC monitoring and reporting data and documents	Data and document review
				GCC senior management	KIIs
				IDRC senior management involved with DIF-H	KIIs
				IDRC personnel involved with monitoring	KIIs
	5.3	What attempts at economy have been made by DIF-	Evidence that management attempted to minimize procurement costs; evidence that mechanisms to monitor	GCC program officers and portfolio managers	FGDs
				Literature on the economy of other programs	Literature and data review
DIF-H administrative and financial data				Data review	

5.4	<p>H and do these actions appear to have resulted in an acceptable level of economy?</p>	<p>and reduce inputs were put in place; evidence that all acquired inputs were utilized, absorbed and needed; evidence that sufficient quality and quantity of inputs were acquired to meet DIF-H's needs and that lack of resources did not compromise DIF-H's performance</p>	<p>GCC and IDRC monitoring and reporting data and documents</p>	<p>Data and document review</p>
			<p>GCC senior management</p>	<p>KIIs</p>
			<p>IDRC senior management involved with DIF-H</p>	<p>KIIs</p>
			<p>IDRC personnel involved with monitoring</p>	<p>KIIs</p>
	<p>Do DIF-H's structure, governance and processes enable or disable performance (achievement of expected outcomes, and efficiency and economy), and would alternative models result in better or worse performance?</p>	<p>Roles, responsibilities and accountabilities are clearly defined and implemented as planned; program adaptations are clearly defined and agreed by all parties; consortium member activities are carried out effectively, synchronistically and synergistically; evidence of good communication and cooperation; timely and effective dispute resolution; evidence that information flows between partners in a timely and appropriate way. Also, consortium partners add collective value to DIF-H by: providing inputs that individual members could not contribute to the same degree alone, permitting more rapid start-up time, minimizing risk, and improving effectiveness, efficiency and economy. In addition, DIF-H roles do not compromise the ability of individual partners to function effectively; alternative models for DIF-H are explored and appropriately rejected; and the degree of agreement regarding the view that explored or hypothetical alternative models would not result in better performance</p>	<p>DIF-H and consortium member documents</p>	<p>Literature and data review</p>
			<p>GCC and IDRC monitoring and reporting data and documents</p>	<p>Data and document review</p>
			<p>Board of directors</p>	<p>KIIs</p>
			<p>GCC senior management</p>	<p>KIIs</p>
			<p>IDRC senior management involved with DIF-H</p>	<p>KIIs</p>
			<p>CIHR senior management involved with DIF-H</p>	<p>KIIs</p>
			<p>Government of Canada</p>	<p>KIIs</p>
			<p>GCC program officers and portfolio managers</p>	<p>FGDs</p>
			<p>Relevant IDRC departmental directors</p>	<p>FGDs</p>

C. Information on data sources used to inform this evaluation

Data sources used for the evaluation of Core Issues 1, 2, 3 and 5

The following data sources were used to inform the findings for the relevance section (Core Issues 1, 2 and 3), and the efficiency section (Core Issue 5) of the evaluation. These data sources were also used to provide context to the results achieved section (Core Issue 4), and to cross-check findings, but they were not used to determine the results that DIF-H achieved.

DIF-H document portfolio

GCC provided an extensive portfolio of documents relevant to the implementation of DIF-H. IDRC also provided information on the oversight of DIF-H. These documents offered valuable information about, and evidence of, DIF-H's processes, finances, activities, outputs and outcomes. The documents that informed the evaluation findings are presented in the bibliography.

Publically available academic and grey literature

The external documents used to inform the findings of this evaluation are included in the bibliography.

GCC Expert Review Panel discussions

The GCC board of directors has commissioned a parallel review of GCC, to be conducted by a panel of international experts. The summative evaluation team leader met with the chair of the Expert Review Panel to discuss the panel's findings. The evaluation team also read a preliminary draft copy of the Expert Review Panel report. The Panel's findings were considered in this evaluation, where appropriate.

Interviews and discussions with key informants and field-based case studies in Peru

37 interviews and focus group discussions were held with key informants including: current and previous DIF-H consortium members, external experts, key stakeholders, and beneficiaries. These were conducted via telephone or in-person in Canada.

The field visit to Peru involved meeting with and interviewing 7 GCC grantees and external stakeholders, and observing the activities of 2 DIF-H funded projects. For confidentiality reasons, the names of respondents are not reported.

Data sources used to determine the results achieved by DIF-H (Core Issue 4)

The following data sources were used to determine and report the results achieved by DIF-H (evaluation of Core Issue 4). The data sources presented above provided the context and background to these data, which was important for cross-checking and understanding the results. However, only the data sources listed below were used to determine the results achieved by DIF-H.

Annual Letter 2015

The Annual Letter 2015 was current as at May 2015. It provides approximated aggregated claims for lives saved and lives improved. No disaggregated data on individual grand

challenges or projects is given. It is included because it is the most recent official reporting of results that includes lives saved and lives improved.

Annual Report 2013–2014

The Annual Report 2013–2014 was current as at March 2014. It represents the officially released results of GCC. It contains results for 94 out of 537 of the grand challenge projects, disaggregated by grand challenge. However, lives saved and lives improved are not mentioned, only beneficiary access for Stars, SLAB, and Global Mental Health. Other outcomes and outputs are also reported. No individual project-level results or financial data are given. It is included because it is the most recent annual report.

Results Dashboard

The Results Dashboard is the most complete and recent set of results for the Stars, TTS, and Diagnostics grand challenges, current as at June 2015. As such, it reflects the most recent calculations of results for these portfolios. Aggregated results claims for ultimate and intermediate outcome indicators are included, as well as disaggregated results claims for the top performing projects. It also contains projections for lives saved and lives improved. However, it does not contain any results data for the other grand challenges, nor financial data for any projects. As an internal reporting document, it is considered by GCC to be a work in progress.

Strategy Roadmap

The Strategy Roadmap was current as of March 2015. It contains aggregated results claims for ultimate and intermediate outcomes for all grand challenges (except Hypertension and Explorations). However, the results claims in this document are only based on 299 of 654 projects. Financial and funding data are provided which correspond to the aggregated grand challenge claims. Individual project-level data and results are not provided, but the Strategy Roadmap closely corresponds to the GCC project database where these data are provided.

This is the only results document that corresponds to the GCC project database and financial reports, and is the most recent and complete set of results for all of the grand challenges. Therefore it is the most coherent and useful GCC results document.

GCC project database

The GCC project database was current as of March 2015, and closely corresponds to the Strategy Roadmap. It contains a full list of projects funded by GCC, alongside funding information. Originally the database contained some projects that were not in the Strategy Roadmap (USAID-managed SLAB projects, non-GCC-funded and unconfirmed TTS projects), but these were removed so that the project database matched the Strategy Roadmap (there is a discrepancy in respect of one SLAB project, but this is due to this project being re-classified as a TTS project).

Additionally, GCC provided outcome statements, which are qualitative summaries of individual project results. The evaluators analyzed these statements and added the data provided to the corresponding project in the database. The outcome statements provide information on all grand challenges (except Hypertension and Explorations), but only for 245 out of 653 projects. Furthermore, the statements did not provide data on all the possible results, and sometimes it was not possible to calculate the results achieved because of a lack of information: e.g. a project claims reduced mortality but population numbers are not

given so lives saved could not be determined. Where this occurred, the basis for these claims in the above results documents is unknown.

Comparison of secondary data sources

Table 11 shows the data sources, when they were current, and the total number of projects that were in the portfolio at this time. Table 12 presents the data sources by the number of projects that results claims are based upon.

Table 11: Results sources by type of report, date when current, and number of projects in portfolio at this time.

Data source	Internal monitoring data			Official reports	
	GCC Dashboard (Current Jun-15)	Strategy Roadmap (Current Mar-15)	Validated GCC database (Current Mar-15)	2013-2014 Annual Report (Current Mar-14)	2015 Annual Letter (Current May-15)
Stars	471	471	471	392	x
TTS	58	31	31	11	x
Diagnostics	12	12	12	12	x
Explorations	x	6	6	6	x
SLAB	x	25	24***	18****	x
Saving Brains	x	52	52	40	x
Global Mental Health	x	51	51	49	x
Hypertension	x	6	6	6	x
Number of projects results claims are based on	541	654	653*	534**	x

'x' denotes that no information is given.

* GCC supplied database with projects removed so that the database matches the Strategy Roadmap; 65 USAID-managed SLAB projects, six non-GCC funded TTS projects, and one TBD TTS project removed. The missing project is a double-counted SLAB project that appears in both the SLAB and TTS portfolios.

** The total number of projects listed in the annual report (page 10) is 537 (538 minus the Global Health Investment Fund). However, this is an error: it should be 534.

*** One SLAB project was mistakenly included in the Strategy Roadmap because it was reclassified as a TTS project.

**** Only 18 of the SLAB projects are managed by GCC; the total number of SLAB projects managed by all partners is 61.

Table 12: Results sources by type of report, date when current, and number of projects that results claims are based upon

Data source	Internal monitoring data			Official reports	
	GCC Dashboard (Current Jun-15)	Strategy Roadmap (Current Mar-15)	Validated GCC database (Current Mar-15)	2013-2014 Annual Report (Current Mar-14)	2015 Annual Letter (Current May-15)
Stars	471	170	200	62	x
TTS	58	16	2	0	x
Diagnostics	12	12	12	0	x
Explorations	0	0	0	0	x
SLAB	0	24	10	24	x
Saving Brains	0	26	13	0	x
Global Mental Health	0	51	8	8	x
Hypertension	0	0	0	0	x
Number of projects results claims are based on	541	299	245	94	x

'x' denotes that no information is given.

GCC grant applicant survey

The GCC applicant survey was current as at late June 2015. It was developed by the evaluators, with input from IDRC and GCC. It was designed to capture self-reported data from GCC applicants and grantees. The information collected includes: demographic information on respondents; information related to respondents' applications and funded projects; self-reported impacts, outcomes, and outputs and perceptions of the GCC application and grant management process.

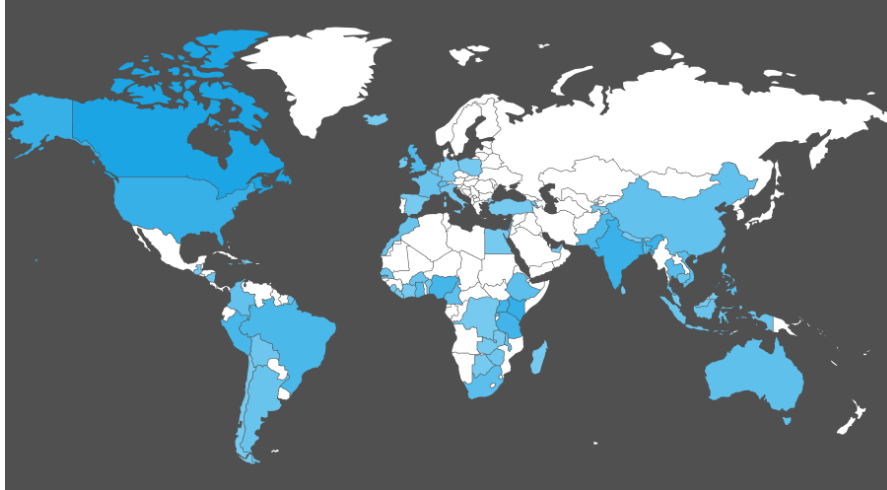
The survey was sent out to 2130 individuals who applied in response to GCC RFPs, and individuals who applied for USAID-administered SLAB RFPs that received grants from GCC. This is all the applicant email addresses provided by GCC once the email address list was cleaned. However, the total number of applications according to document 2.U (Application statistics across GCC programs) was 5609—although this may include applications to partner managed grants. Therefore the survey was sent to at least 40% of all applicants to GCC.

The survey was open for two weeks and was available in English and French. The response rate was 31%, including emails that failed or were sent to the wrong person. The completion rate was 81%. The response and completion rate for GCC-funded applicants was much higher than for respondents whose application(s) were rejected.

A total of 664 surveys were completed. This included: 361 responses from applicants that were funded by GCC (approximately half of all GCC grantees); 68 responses from applicants

that were rejected by GCC but whose projects were subsequently funded through another source; and 169 responses from applicants who were rejected by GCC and whose projects were not subsequently funded. The remaining 66 respondents did not provide funding information.

Figure 6: Graphical representation of the geographical distribution of respondents



D. Case study 1: Rapid syphilis tests as a catalyst for health system strengthening: a case study from Peru

Mother-to-child transmission of syphilis continues to be a public health problem and represents an easily treatable cause of negative birth outcomes. Globally, it is estimated that approximately 2 million pregnancies each year involve women with syphilis (McDermott, Sketee and Larsen, 1993). Untreated syphilis can lead to fetal loss or still-birth. In live-born infants it can lead to neonatal death, prematurity, low birth weight or congenital syphilis. In pregnant women infected with syphilis, adverse birth outcomes are common and have been shown to be 4.5 times higher in untreated women compared to women without the disease (Claire Bristow, Oxford University 2014). Yet, the treatment is simple: a single dose of penicillin before 28 weeks gestation prevents these adverse outcomes.

In 2010, the WHO called for the dual elimination of mother-to-child-transmission of HIV and syphilis with new strategies and integrated monitoring and evaluation activities (WHO, 2013a; Pan American Health Organization, 2010). Until recently however, diagnostic tests were not available in Peru (Dinh *et al.*, 2013). Numerous barriers have been identified which limit the effective screening and treatment of pregnant women, including lack of tests at health facilities, cost of screening, and delays in providing test results (Garcia *et al.*, 2013).

What was the proof-of-concept and how did it respond to the integrated innovation principles?

An innovator from the Cayetano Heredia University in Lima, Professor Patricia Garcia, submitted a proposal to GCC to fund operational research that would distribute rapid dual HIV and syphilis tests to rural communities in Peru. The project, Brighter Futures, aimed to determine the acceptance and effectiveness of the rapid test.

Prof. Garcia was trying to prove that the dual HIV and syphilis test, which is recommended by WHO but not used in many countries (in 2010 there was evidence of the policy implementation only in Haiti), was effective and positively accepted by communities. The innovation was not the invention of the diagnostic tool itself but rather finding a way to address the implementation gap that was hindering the implementation of an international evidence-based guideline. Prof. Garcia's approach was an implementation of integrated innovation. It proposed testing a comprehensive model, from the acceptance of the patients all the way to accessing the treatment drug once test results were available.

The direct impact of DIF-H-funded intervention

During the pilot phase funded by the project, 2,798 women were screened and referred for treatment for HIV, syphilis and anemia. These patients had access to a new service and may have had their life considerably improved, without counting the future infections this avoided. The project also trained 514 formal and informal health care providers to administer the tests.

The research created new localized knowledge, and supported a policy change. It concluded that the test was effective and well accepted in Peru. Prof. Garcia published two papers in peer-reviewed journals and has an additional five in press. This project enabled her to make a case to the Ministry of Health; today in Peru, dual HIV and syphilis tests have become part of the antenatal care (ANC) protocol. Since 2015 a new line was added to the Ministry of Health budget to ensure the required resources are allocated to continue implementing this policy. It is estimated that there are 800,000 pregnant women per year in Peru and ANC coverage is 98%. With a mandatory dual

test during ANC it is reasonable to estimate that there are now about 784,000 pregnant women are screened each year for HIV and syphilis in the country.

Brighter Futures went beyond these impacts

The project was instrumental in changing national procurement processes to be more effective, and resulted in a partnership between the Ministry of Health and the United Nations Children’s Fund (UNICEF). The project was designed according to a service delivery and health system strengthening approach, to ensure a continuum of care. The partnership with the Ministry of Health ensured penicillin was available in the case of a positive diagnosis, thereby avoiding losing contact with the patient between the diagnostic result and treatment. A pharmacy model that links the diagnostic directly with the treatment drug has been adopted and is scaling up through one of the main pharmacy chains in Peru (*Boticas Arcangel*).

Finally, this intervention enabled two further valuable changes. Firstly, it changed the behaviour of Peruvians toward rapid tests, with which there had been a legacy of negative experiences, resulting in reluctance within the national health system to use these diagnostic instruments. Secondly, the training of informal health workers not only enabled a faster scale-up of the test administration, but also had a positive impact on the position and recognition of informal health workers in the country, where there is little consideration of, and willingness to work with, untrained health staff.

Brighter Futures’ budget was \$940,022. The table below details the final project results and outputs and respective costs²⁰. However, this does not account for the potential future impacts of the project.

Results and outputs	Cost in C\$
Cost per publication (counting five publications)	188,004
Cost for policy change (counting three policy changes)	313,341
Cost per women screened and referred for treatment for HIV, syphilis and anemia (2,798)	336
Cost per women as direct beneficiaries (2,798) and all health workers trained (514)	284

E. Case study 2: Saving Brains, Leonid Lecca, HPI and Socios en Salud: The Casitas project

Maribel Muniz, a GCC grantee, believes that ‘tiny smiles make big changes’. With a grant from GCC, she is trying to measure the positive impact of those smiles, and she is getting impressive results.

There is an international consensus regarding the importance of providing good care for children: all children need to be cared for, especially children suffering from neurodevelopment delays (NDD). Unconventional research also demonstrates that this does not only include access to basic needs – appropriate food (in quality and quantity), health, education, etc. – it also includes tenderness, love, and attention. This type of research usually has less traction with funders: its findings represent no economic interest and yet it has significant potential to improve lives.

Casitas is a project in Peru, implemented by Socios en Salud. With less than C\$100,000 a team of community health and social workers are taking time to visit young parents to explain the importance of giving their children tenderness and attention. The project attempts to measure, both qualitatively and quantitatively, the impact of this love and care on the children. It also aims to provide evidence of the efficacy of a community-based intervention, improve parenting behaviour to support child development and reduce NDD among children in low resource settings.

The project manager told us that before GCC, Socios en Salud was focused on clinical research. GCC was the first funder that was interested in funding the intervention as a research and implementation project, and it was truly interested in the implementation component and was flexible enough to allow it to be responsive to the realities found on the ground.

The project focuses on children with NDD and aims to demonstrate the feasibility and the efficacy of a community-level intervention to reduce NDD among children in vulnerable and poor neighbourhoods. A target population was defined and split into three intervention arms: to one group the intervention provided nutritional support; to the second group the intervention provided nutritional support and the community-based intervention delivered at home on a one-to-one basis; the third group also had the nutritional support but the community-based intervention was delivered in groups. In fact, all of the household children and the parents benefited from the intervention.

Preliminary findings suggest that ensuring children are cared for with tenderness and attention has a measurable impact on their growth, compared to those that only receive nutritional support. Tiny smiles seem to not only change the families and communities, they also improve children’s growth. These findings are powerful. With these results, Casitas was able to mobilize the municipality where the pilot is being conducted, a poor neighbourhood of northern Lima, to scale the intervention up in partnership with the public sector. Casitas is also working in close relationship with the Partners in Health Network, mainly in Rwanda and Haiti, to replicate the experience.

F. GCC Logic model used to measure achievement of expected results

Ultimate outcome indicators	<ul style="list-style-type: none"> • Lives saved • Lives improved
Intermediate outcome indicators	<ul style="list-style-type: none"> • Increased use of innovative health products/services by target population • Increased use of innovative health products/services by families, communities, health providers in developing countries
Immediate outcome indicators	<ul style="list-style-type: none"> • Increased access to innovative health products and/or services by target populations in developing countries • Increased adoption of innovative health policies, regulations, or legislation contributing to solving global challenges in developing countries • Increased jobs created related to innovative health products and/or services in developing countries • Increased knowledge and awareness of positive international Canada brand • Improved development innovation platform in Canada
Outputs	<ul style="list-style-type: none"> • Innovative prototypes or service delivery models developed and/or scaled • Targeted challenge-specific outcome metrics developed • Private sector engaged • Canada brand awareness raised • Lessons learned and outcomes monitored and evaluated • Results published and patents filed • Targeted challenge-specific global partnerships formed • Targeted challenge-specific communities of innovators formed • Funds leveraged by projects • Canadian diplomacy enabled • Grand challenge model adopted and enhanced • Risks managed • Efficient operating model maintained