

# Success in the South Pacific: a case study of successful diffusion of an infection prevention and control program

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**Abstract.** *Introduction:* The aim of this study was to explore the role of the Diffusion of Innovations framework in adopting an infection prevention and control program (IPCP) in a low and middle income (LMI) country, the Republic of Kiribati.

*Methods:* Case-study methodology was used to examine and contextualise the analysis of the Republic of Kiribati's adoption of the IPCP from 2003 to 2010. Data were collected from multiple sources including semi-structured interviews, IPCP documentation, program evaluation and a healthcare worker survey. Data were subjected to thematic analysis and descriptive statistics where relevant to the study design.

*Results:* It was found that the self-initiated progression of activities and stimuli has resulted in the successful adoption of a comprehensive IPCP. The process followed the staged model of the classic Diffusion of Innovations process in organisations described by Everett Rogers.

*Conclusion:* This case study provides an illustration of how a comprehensive IPCP can be adopted in a LMI country setting with little involvement from external agencies. It identifies key stimuli, opportunities and activities which could be similarly adopted and implemented by other LMI countries.

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## Introduction

Prevention and control of healthcare-associated infections (HAI) is an increasingly important element in the provision of health services globally. It relates to not only protecting those accessing health services from the spread of infectious or pathogenic disease but also protecting healthcare workers, their families, and other persons associated with health services. This is of particular concern in low and middle income (LMI) countries where there are minimal infection control guidelines, infrastructure, policy directives or persons responsible for establishing, implementing and monitoring infection control programs.

An infection prevention and control program (IPCP) is a collection or cluster of activities, resources, policies and procedures designed to control and prevent the transmission of infectious diseases within the healthcare environment.<sup>1</sup> The core components of an IPCP are individual but inter-related, collectively comprising a specific innovation package. Core

components of an IPCP have been categorised by the World Health Organization (WHO) as:

- organisation of IPCP
- technical guidelines
- human resources
- surveillance of infections and assessment of compliance with infection prevention and control practices
- microbiology laboratory support
- environmental minimum requirements
- monitoring and evaluation of programs
- links with public health or other relevant services.<sup>2</sup>

The efficacy of infection control programs in reducing the incidence of HAI has been well established in the literature, particularly in developed or high income countries.<sup>3,4</sup> These infection control programs are informed by evidence-based guidelines and advice developed by internationally recognised health authorities such as the United States Centers for Disease Control and Prevention (CDC) and the WHO.

### Implications

- Diffusion of Innovations is a model that can be successfully used in the adoption of comprehensive infection prevention and control programs in the low and middle income country setting.
- An event such as a worldwide infectious disease outbreak can be an important impetus to identify gaps in health service provision, providing an opportunity for growth.

Based on such advice, many countries, including resource-limited or LMI countries, attempt to establish infection control programs with varying degrees of success.<sup>5–7</sup> From the experience of the first author it appears that the standards set by these guidelines and advice are unachievable due to resource limitations, lack of engagement of healthcare workers and health authorities, lack of expertise, and institutional and priority competition.

The Republic of Kiribati appears to be an exception to these general findings and experience. In 2003, the first author visited Kiribati during a severe acute respiratory syndrome (SARS) rapid preparedness assessment of infection prevention and control capacity. The assessment found limited infection prevention and control programming and activities. Kiribati was visited again in 2005 to review infection prevention and control capacity. This 2005 review found evidence of significant improvements in the overall program, increased activities and what appeared to be genuine enthusiasm for infection prevention and control. A progressive adoption of infection prevention and control activities was evident and it appeared that a comprehensive program would result. The extent of these changes was not typical of other LMI countries in the region.

### The Republic of Kiribati

The Republic of Kiribati is a central western Pacific country of 33 atolls and reef islands in three main island groups, the Gilbert, Phoenix and Line Islands. Kiribati has a total land mass of 811 km<sup>2</sup> spread over 3.5 million kilometres of ocean. It has a population of ~100 000 and an annual population growth rate of 1.7%. The most populated islands are South Tarawa, North Tarawa and Kiritimati Island with urban growth rates of 5.2%, 4.8% and 8% respectively.<sup>8</sup> Compared with most other Pacific islanders, I-Kiribati have a short life expectancy of 65 years for males and 70 years for females.<sup>8</sup>

The health system of Kiribati is publicly funded with government spending \$13.45 million USD in 2008, primarily on curative services, pharmaceuticals and staffing.<sup>8</sup> Significant technical and financial assistance is provided to the Ministry of Health by development partners.<sup>9</sup> The formal health system is administered by the central Ministry of Health. Traditional healers provide a parallel service offering local medicines, massage, antenatal, childbirth and postnatal

care. Most people use both services though there is no coordination between them.<sup>8</sup> Primary health care is provided through a network of 92 health centres and dispensaries. Basic hospital services are available at South Tarawa (Betio), Kiritimati Island and North Tabiteuea. Secondary care is provided by the 130-bed national referral hospital, Tungaru Central Hospital in South Tarawa. Acute-care services include surgery, obstetrics, paediatrics, internal medicine, special-care nursery and tuberculosis treatment. Patients requiring tertiary-care services may be referred overseas for treatment if they meet the criteria defined by the Ministry of Health.

The healthcare workforce is made up of both locally and internationally trained individuals. The chain of command is hierarchical, with a top-down approach to decision-making, though evidence of collaboration and co-operation is evident in the structure and activities of various committees, particularly the Infection Control Committee. Senior staff and directors are seen as the decision-makers within the system as they hold positions of influence based upon their skills, experience and expertise.

### The study: exploration of the Kiribati case

Exploring and identifying the process of successful IPCP adoption is important to assist other countries in their adoption and implementation of IPCPs. This is particularly salient where LMI countries are relying on guidance established for use in well resourced settings, which often provides them with a poor practical fit.<sup>10</sup> To gain a greater understanding of this process of adoption, further exploration of the key elements and stages of the process itself is required, not just whether selected key components are in place.

A theoretical framework which is appropriate for conducting an exploration of these key elements and stages is the classic Diffusion of Innovations theory. Classic Diffusion of Innovations theory describes ‘...the process by which an innovation is communicated through certain channels over time among the members of a social system’ (p. 5).<sup>11</sup> Diffusion of innovations theory has its roots firmly embedded in agriculture and geography. The concepts central to this theory were first described in the 1930s by researchers studying the adoption of hybrid corn in farming. Whilst observing the process they noticed patterns of communication and influence amongst farmers.<sup>12</sup> Since then Everett Rogers has been primarily responsible for the scholarly development of diffusion of innovations theory.<sup>11,13–16</sup> Other scholars who have contributed significantly to the development of the theory include Brown, Downs, Mohr, Tornatzky and Fleischer.<sup>17–19</sup>

The classic diffusion of innovations theory as it relates to organisations provides a framework through which the adoption of IPCPs can be examined. In every diffusion research study, program or campaign, four key elements are always present:<sup>1</sup> an innovation,<sup>2</sup> communication channels,<sup>3</sup> time, and<sup>4</sup> a social system.<sup>11,13,14</sup> These elements inform the process, whether for an individual or for an organisation. It is

from this perspective that the Kiribati IPCP adoption process shall be explored.

When examining the diffusion of an IPCP in a healthcare environment the innovation<sup>1</sup> would be the program. The communication channels<sup>2</sup> are the means by which information and messages about IPCPs are shared. Time<sup>3</sup> includes the rate of adoption, the innovation-decision process and the innovativeness of the individual or organisation. The social system<sup>4</sup> is the healthcare environment and infrastructure where the adoption is to take place. Together, these four elements work to create an environment and context where the new innovation (the IPCP) is established and embedded, and conditions emerge which encourage an organic evolution of the innovation to more directly solve the targeted organisation problems, in this case the prevention of HAI. This organic evolution follows a staged adoption process in an organisation, such as the Kiribati healthcare organisation. The stages are: <sup>1</sup> agenda-setting, <sup>2</sup> matching, <sup>3</sup> redefining and restructuring, <sup>4</sup> clarifying and <sup>5</sup> routinising.<sup>11</sup> The process is not entirely linear and is responsive to the four key elements previously mentioned.

To discuss the role of diffusion of innovations in IPCP adoption, a case study of the Republic of Kiribati was developed, identifying the four key elements of the process, but more importantly exploring and discussing the stages of the innovation process in the Kiribati healthcare organisation. The specific methodology and findings of the Kiribati study have been reported elsewhere.<sup>20–22</sup> This paper discusses the Kiribati case specifically in relation to the diffusion of innovations process in the healthcare organisation.

## Methods

In order to understand the IPCP adoption process in an LMI country setting, a case study of the Kiribati IPCP was undertaken in 2010, examining the program's evolution from 2003 until 2010. A single-case study approach was chosen for this project as it facilitated the exploration, within a specific context, of the adoption of an IPCP. This study seeks to explore the contemporary phenomenon within its real-life context.<sup>23</sup> The case-study method calls for a triangulating process using multiple sources of evidence, both qualitative and quantitative, to explore the research questions to enhance rigour.<sup>23,24</sup> Triangulation in this study was achieved through the analysis of multiple sources of data which are each causally separate and have been reported as such elsewhere.<sup>20–22</sup> Ethics approval was gained from the Ministry of Health, Kiribati and the University of Wollongong Human Ethics Committee (HE09/386).

### *Documenting the adoption of the IPCP in Kiribati*

To document the adoption of the IPCP in Kiribati an investigation strategy comprising four components was used:<sup>1</sup>

- (1) evaluation of current IPCP status in Kiribati using a pilot evaluation tool with thematic analysis of findings and recommendations – to identify the current infection

prevention and control activities and how they correspond with the core components of a comprehensive program,<sup>2</sup>

- (2) survey of healthcare workers' knowledge, application and confidence with infection prevention and control principles and practice using a previously validated self-administered tool – to identify strengths or deficits in the education component of the program,<sup>3</sup>
- (3) chronological and thematic analysis of Republic of Kiribati IPCP documentation (e.g. infection control manuals, infection control committee minutes) and findings and recommendations of IPCP assessments performed by Republic of Kiribati staff and external agencies and consultants – to explore the key elements of the diffusion of innovation process,<sup>4</sup>
- (4) semi-structured interviews with key informants in the Republic of Kiribati and external agencies (using snowball sampling) – to explore the key elements of the diffusion of innovation process.

These data sources provide evidence of the four key elements and illustrate the five stages of the adoption process in an organisation. More specifically, the interviews and the documentation analysis explore the communication channels, social system, the time it took the innovation to be adopted and the five stages of the adoption process in the organisation. The healthcare worker survey and the evaluation of the IPCP more specifically, provide information on the innovation itself as well as providing evidence of the clarification and routinising stages of the adoption process. The methods and results for these have been reported elsewhere.<sup>22</sup>

The healthcare worker survey assessed the knowledge, application and confidence of staff with infection prevention and control principles and practice using a previously validated self-administered tool.<sup>25</sup> This was performed to identify strengths and deficits in the education component of the program.

Evaluation of the current IPCP status in Kiribati was achieved using a pilot evaluation tool, the Infection Prevention and Control Program Evaluation (IPCPE). This was performed to identify the current IPCP activities and how they correspond with the core components of a comprehensive program.<sup>22</sup>

Using the case-study method to explore the innovation process in the Kiribati healthcare setting provides an opportunity to analyse and critique the applicability of the diffusion of innovation process for adoption into other healthcare settings. To this end the results of the study are discussed together, highlighting the stages of the process, providing a narrative of the organic evolution of the IPCP in the Republic of Kiribati.

## Results and discussion of the findings

### *Diffusion of innovations in organisations*

It has been argued in the literature that classical Diffusion of Innovations theory is limited in its application to organisational adoption of innovations.<sup>12</sup> It was generally accepted that classical theory was limited to explaining

adoption of innovations by single individuals. After the first edition of 'Diffusion of Innovations'<sup>13</sup> was published, Everett Rogers began exploring innovation in organisations, resulting in the development of a clear description of how the classic theory is applied to organisations.<sup>11,15</sup> Rogers suggests that the focus of research into innovation in organisations is on the innovation process itself. This is achieved by using a staged model. The process specific to organisations is a sequence of five stages, which are divided into two sub-processes:<sup>1</sup> initiation and<sup>2</sup> implementation.

The initiation sub-process involves the information gathering, conceptualising and the planning of adoption of the innovation leading up to the point where the decision is made to adopt the innovation. The implementation sub-process comprises all the events, actions and decisions which are involved to put the innovation to use. The decision to adopt, the dotted line, is the event that divides initiation from implementation.<sup>11</sup>

Other researchers have added to this model, examining sequences in the innovation process, divergent and parallel paths, and feedback and feed-forward cycles.<sup>19,26</sup> The IPCP adoption in Kiribati appears to have included sequences in response to stimulus from external and internal sources, yet followed Rogers' clearly staged process, as shall be explored further below.<sup>11</sup>

### Evolution of the Kiribati program

The interviews and documentation analysis were essential for the identification of the stages of the IPCP adoption process. The results from these data sources reveal the chronological picture of the process, commencing in 2003 and continuing to the present day. There is no evidence before 2003 of any

existence of a comprehensive IPCP apart from individual activities that identified the lack of a program as such. These events and stimuli are chronologically summarised in Table 1.

From this chronology, identification of the stages of the innovation process in the Kiribati healthcare organisation can be performed and shall be discussed. This serves to illustrate the impetus to begin and persist with the adoption of an IPCP for other LMI country settings.

### Initiation

#### *Agenda-setting*

The agenda-setting stage provides the motivation for initiating the innovation process. This stage may go on for some time, perhaps years. In the case of Kiribati this stage appears to have occurred in the years up to and including 2003. It is in this stage that the identification and prioritisation of needs and problems occurs, resulting in the search within the organisation for innovativeness to meet these problems.<sup>11</sup> Innovations result not from a single incident – though a shock, such as SARS, can provide the stimulus to address an already known performance gap and initiate the innovation process – but rather through a sequence of events which culminate in a force for change.<sup>27</sup>

#### *Matching*

The second stage of initiation involves the performance gap being matched with an innovation. The responsibility of this matching rests with the organisation's decision-makers who must ensure that it fits, through its planning and design, within the needs and capabilities of the organisation.<sup>11</sup>

The matching stage within the Kiribati case study emerges in a sequence of events after the shock of SARS in 2003 and

**Table 1. Summary of activities in the Kiribati infection prevention and control program (IPCP) adoption process**

Year	Key event or stimuli
2003	<ul style="list-style-type: none"> <li>• Severe acute respiratory syndrome (SARS) preparation identified lack of infection control awareness and program</li> <li>• exposure to external infection control consultants</li> </ul>
2004	<ul style="list-style-type: none"> <li>• Senior nursing staff identifies need for IPCP after completing a Masters of Nursing in New Zealand</li> </ul>
2005	<ul style="list-style-type: none"> <li>• External assistance sought by senior nursing staff and provided to introduce an IPCP in collaboration with local staff</li> <li>• needs assessment performed</li> <li>• local nurse-led infection control committee (ICC) and infection control nurse role established</li> <li>• infection control guidelines, resources and training developed and disseminated</li> <li>• occupational exposure management plan developed and implemented</li> </ul>
2006	<ul style="list-style-type: none"> <li>• ICC becomes multi-disciplinary with national role, IPCP annual work plan developed</li> <li>• surveillance plan implemented</li> <li>• staff hepatitis B vaccination proposed</li> </ul>
2007	<ul style="list-style-type: none"> <li>• education programs reviewed and improved</li> <li>• hepatitis B vaccination program implemented</li> </ul>
2008	<ul style="list-style-type: none"> <li>• IPCP activities included in quality indicators for health</li> <li>• reporting of occupational exposure data at ICC and senior management forums</li> <li>• hand hygiene initiatives developed and implemented</li> </ul>
2009	<ul style="list-style-type: none"> <li>• H1N1 influenza preparation activities coordinated and actioned by IPCP in collaboration with Public Health</li> <li>• direct reporting of surveillance activities to Ministry of Health</li> </ul>
2010	<ul style="list-style-type: none"> <li>• baseline survey of infection control practices, waste management and environmental hygiene conducted with action plans developed and implemented</li> </ul>

up to and including 2005. This resulted in a decision to rectify the infection control performance gap with the IPCP innovation. Successfully matching the problem to the innovation is essential to its success and sustainability, particularly within healthcare organisations.<sup>28</sup> It is at the point after the matching has occurred that the decision to proceed with the innovation occurs and the implementation sub-process can begin.

### The decision to adopt

The decision to adopt appears to have occurred between 2004 and 2005, when the senior nurse returned from New Zealand and external assistance was sought to improve the infection control performance gap.

Rogers describes three types of innovation decisions in organisations:<sup>11</sup>

- (1) optional innovation decisions are made by an individual independent of the decisions made by other members of a system,
- (2) collective innovation decisions are made by consensus among the members of a system,
- (3) authority innovation decisions are made by relatively few individuals in a system where these individuals possess power, high social status or technical expertise.

Given the social system within the Kiribati healthcare organisation and the role of hierarchy, the decision to adopt was not undertaken by one person alone, rather a shared authority of senior staff. The decision to move ahead to reduce the infection control performance gap was an authority innovation decision.<sup>11</sup>

### Implementation

#### *Redefining and restructuring*

The year 2005 was when the implementation sub-process began in Kiribati. The redefining and restructuring stage of the process is the time when the innovation and organisational structure is modified to assist successful adoption.<sup>11,29</sup> It is at this point that the innovation undergoes re-invention to fit the specific needs and structure of an organisation as it is rare for an innovation to fit an organisation perfectly.<sup>11</sup> Through the facilitation of an external consultant, the IPCP was adapted and changed to suit the needs of the organisation. Structural changes were also made to the organisation through the introduction of an Infection Control Committee (ICC) and the establishment of the infection control principal nursing officer position. This demonstrated a feedback and feed-forward cycle that encouraged active participation of the individuals in the organisation.

The redefining and restructuring stage continued through the remainder of 2005 and 2006. These years saw further definition of the IPCP and the organisation with action plans developed based upon internal reviews of the needs of the organisation. A further organisational structure change that occurred during this stage was a change in membership of the ICC to be more representative of the key stakeholders

in the IPCP and provide guidance and co-ordination at a national level.

#### *Clarifying*

The clarification stage of the IPCP innovation occurred between 2006 and 2009. This stage of the process is the beginning of acceptance of the innovation within the organisation. Following its introduction, it becomes more widely used and is further adapted to the environment. During this stage, the Kiribati healthcare organisation utilised the IPCP to establish education programs, develop quality indicators and provide specialist consultation and advice.

Key individuals within the organisation play a significant role in achieving acceptance. These persons are often referred to as champions.<sup>11</sup> Champions are often well respected within an organisation for their position, knowledge, skills and interpersonal style. They can help ease an innovation into the organisational structure because people listen to them.<sup>11</sup> The ICC was expanded during this stage, its membership being champions from the various healthcare disciplines.

#### *Routinising*

The routinising of an innovation is the final stage of the process. This is the point when the innovation has become a part of the everyday operation within an organisation and it no longer holds a separate identity. For an innovation to become routine it must be sustainable. An indicator for the sustainability of an innovation is the degree to which the individuals within the organisation have been involved in the process including its reinvention to fit the needs of the organisation.<sup>11</sup>

A key method for the elimination of barriers in the adoption of an IPCP is the involvement of key stakeholders and opinion leaders. In the Kiribati case, participation of healthcare workers in the innovation process was evident. As previously discussed, broad involvement occurred from the beginning of implementation and was fundamental in the matching stage of the initiation sub-process. Participation allowed the identification and adaptation of appropriate resources and tools for the IPCP. This has assisted in the IPCP being a sustainable innovation in the Kiribati healthcare environment. The founding of regular IPCP activities applicable and delivered across all health services demonstrated the routinising of the program in Kiribati. From 2009 until the present, the activities of the IPCP continue and are accepted as part of the delivery of healthcare in Kiribati. It has now become part of the continuous quality improvement process, a fixture of the education program, a source of advice and information. Kiribati is representative of a case where IPCP adoption has been successful; this, however, is not always the situation.

Studies of the adoption of IPCP in LMI countries are generally unavailable in the literature.<sup>6</sup> What are available though, are reviews of the general issues related to adopting

IPCP in LMI countries or reviews of individual component adoption, such as surveillance. Of these reviews the major problems identified are:

- most LMI countries have weak or absent IPCP
- IPCP are often unidirectional, focusing on only one or a few interventions such as antibiotic usage
- local studies and local expertise are not utilised in developing an IPCP
- appropriate resource allocation to the health sector and delivery system is not addressed
- human resources are not adequately developed to support IPCP adoption
- limited equipment and consumable items such as sharps containers, sterilisers, disinfectants, PPE, running water and electricity are available.<sup>5,7,30–33</sup>

Given these barriers identified for other LMI countries, Kiribati appears to have demonstrated a concerted effort to adopt infection prevention and control activities which together create a comprehensive IPCP. In the context of the classic diffusion of innovations framework, this can also be described as a technology cluster or innovation package. Rogers identifies a technology cluster as a group of individual components that are closely inter-related and that can be adopted as a package of technology or innovation package.<sup>11</sup> In the Kiribati case there is evidence, supported by the IPCPE and healthcare worker survey, of the adoption of infection prevention and control activities or innovation package which has evolved into an IPCP.

### Evidence of routinisation of the innovation

The healthcare worker survey and the infection prevention and control program evaluation (IPCPE) served to validate the presence and adoption of the IPCP in Kiribati by verifying the activities that had occurred since 2003. They also served to provide evidence that the key components of an IPCP, as previously described by WHO,<sup>2</sup> were in existence.

The IPCPE tool that was developed as part of the study indicated that the program met a minimal level of compliance of 75%, where a score greater than 76% is required to show at least a partial level of compliance. The areas which demonstrated the greatest need for improvement were the epidemiological surveillance of infections and hospital environment and sanitation.

In the area of epidemiological surveillance of infections, the main concern was related to issues also relevant to the partially compliant area of microbiology, such as the inability to identify organisms that caused local HAI and their associated susceptibility patterns. The minimal compliance with hospital environment and sanitation was indicative of the physical limitations of the environment and climate in Kiribati. The structural maintenance and improvement of the facility was largely dependent upon the capital and financial input of donor organisations. Cleaning of patient care equipment and safe disposal of waste was also identified as an area in need of attention, though in contrast sharps safety and disposal was found to be exceptional and as an independent

**Table 2. Results of the Infection Prevention and Control Program Evaluation**

Area	%	Level of compliance
Organisation	100	Compliant
Epidemiological surveillance of infections	35.3	Minimal
Microbiology	83.3	Partial
Intervention strategies	76.3	Partial
Sterilisation and high-level disinfection	87.5	Compliant
Personnel health	78.6	Partial
Hospital environment and sanitation	60.9	Minimal
Ineffective practices	77.8	Partial
Overall	74.56	Minimal

**Table 3. Healthcare worker survey relationships between variables of knowledge, application and confidence**

	Knowledge	Application	Confidence
Knowledge	–	0.241*	0.283**
Application	0.241*	–	0.569**
Confidence	0.283*	0.569*	–

\*Correlation is significant at the 0.05 level (two-tailed).

\*\*Correlation is significant at the 0.01 level (two-tailed).

measure reached full compliance at 87.5%. The results of each area examined as part of the IPCPE are detailed in Table 2.

The area ‘organisation’ achieved complete compliance. Within this area is the educational component of the program which was verified by the healthcare worker survey. The survey demonstrated that staff had a good knowledge of standard precautions in comparison to additional precautions and they felt confident in their ability to apply infection prevention measures in their clinical practice. Pearson correlation analysis revealed a significant relationship between knowledge, application and confidence in applying infection control precautions as shown in Table 3.<sup>22</sup>

What is interesting in the Kiribati case is that the healthcare organisation appears to have been able to address issues that often prevent the adoption of IPCP in other LMI countries. Methods to overcome these issues include ensuring that IPCP is adapted to the local environment and context, making use of available resources, and targeting interventions to those infectious diseases of local importance.<sup>34–36</sup> These methods are integral to the diffusion of innovations framework in an organisation.

### Conclusion

The findings demonstrate that the classic Diffusion of Innovations for Organisations is a model that can explain the adoption of the IPCP in the Republic of Kiribati. Given this situation it may be useful as a framework for LMI countries to follow in the adoption of a comprehensive IPCP. The Kiribati case clearly demonstrates the successful and consistent progression of the innovation process in an organisation through initiation and implementation. This is demonstrated

through application of the staged model of Diffusion of Innovations for Organisations. The routinisation of the program is confirmed through the evaluation of the current IPCP and the status of healthcare workers' infection control knowledge and skill and their confidence in applying this in practice. This case clearly identifies the importance of involving the end users in the innovation process as well as the particular role of champions in supporting implementation.

The Kiribati case illustrates how an IPCP can be adopted with little involvement from external agencies and how important it is to recognise performance gaps to catalyse change in the healthcare environment. The awareness of staff within the health system to identify opportunities is paramount as is their ability to motivate change and seek the resources to enable it. By presenting a story of successful adoption, other LMI countries can feel inspired to venture on a similar journey.

### Limitations

This is a case study of an individual situation and hence the findings of this study cannot be generalised to other LMI country situations, though lessons learnt may be valuable. The findings of this study are applicable to the population and organisation represented. Recommendations for future research include the testing of both the IPCPE and the survey tool in other settings and other populations to increase the ability to generalise the findings.

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