HUMAN RESOURCES FOR HEALTH: PRACTICE AND POLICY IMPLICATIONS FOR EMERGENCY RESPONSE ARISING FROM THE CHOLERA OUTBREAK IN PAPUA NEW GUINEA

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ACRONYMS

CPHL  Central Public Health Laboratory
HIV   human immunodeficiency virus
IHR   International Health Regulations
MSF   Medecins Sans Frontières
NDoH  National Department of Health
NSO   National Statistical Office
NTF   National Cholera Task Force
TB    tuberculosis
WHO   World Health Organization

A note about the use of acronyms in this publication

Acronyms are used in both the singular and the plural, e.g. NGO (singular) and NGOs (plural). Acronyms are also used throughout the references and citations to shorten some organisations with long names.
SUMMARY

Health services in Papua New Guinea experience challenges in the availability and distribution of all cadres of health professionals. In recent years, a large cholera outbreak has placed significant pressure on clinical and public health services.

We describe some of the challenges to cholera preparedness and response in this human resource-limited setting, the strategies used to ensure effective cholera management, some lessons learnt as well as issues for public health policy and practice.

Cholera Task Forces were useful to establish a clear system of leadership and accountability for cholera outbreak response and ensure efficiencies in each technical area.

Cholera outbreak preparedness and response was strongest when human resource and health systems functioned well prior to the outbreak. Communication relied on coordination of existing networks and methods for empowering local leaders and villagers to modify behaviours during the outbreak.

In addition to establishing and working towards human resource targets for different cadres of clinical staff, similar targets should be established for all cadres of public health professionals involved in health emergency preparedness and response, and public health services more widely.

In line with the national health emergencies plan, the successes of human resource strategies during the cholera outbreak should be built upon through emergency exercises, especially in non-affected provinces.

Population needs for all public health professionals involved in health emergency preparedness and response should be mapped and planning should be implemented to increase the numbers in relevant areas. Human resource planning should be integrated with health emergency planning.

It is essential to maintain and strengthen the human resource capacities and experiences gained during the cholera outbreak to ensure a more effective response to the next health emergency.
INTRODUCTION

Papua New Guinea is the largest Pacific Island country, with 800 culturally and linguistically different groups divided into 4 regions, 20 provinces and 89 districts. The threat of natural disasters and emergencies, including cyclones, tsunamis, volcanic eruptions, earthquakes, tribal fighting, drought, flooding and mudslides, is widespread [ABC News 2007; BOM 2007; Dent et al. 1995; Taylor et al. 1998].

The population growth rate is high (2.7% per year), and it is estimated that by 2020 the population will be almost 9 million compared to the estimated 6.1 million in 2006 [NSO 2006]. Papua New Guinea has a young population, with 40% of the population under 15 years, a crude birth rate estimated at 35.0 per 1,000 population and a life expectancy currently estimated at 62 years for men and 65 years for women [NSO 2006].

In recent decades, the epidemiological profile has remained relatively static, with the major health problems largely unchanged. Previous surveys estimated the infant mortality rate at 64 per 1,000 live births, child mortality at 25 per 1,000 live births [NSO 2006], and maternal mortality at 700 - 800 per 100,000 live births.

Infectious diseases, malnutrition, trauma, different types of violence, and the complications of pregnancy and childbirth continue to be the main health problems for the majority of the rural population [WHO 2013].

However, in recent times, incidence of infectious diseases has grown as a result of the increased size and mobility of the population, and the growth of densely populated peri-urban squatter settlements around the major provincial cities. Papua New Guinea is strengthening its systems to identify, assess and respond to health emergencies in line with the Asia Pacific Strategy for Emerging Diseases [WHO WPRO 2010].

There were in excess of 15,000 official notifications and 500 deaths of all ages; however, the true number of cases is likely to be much higher as much of the population did not have health system access, and existing surveillance systems faced important challenges.

Papua New Guinea has the highest gross domestic product in the Pacific, yet it invests only a small percentage (3.1%) in health [WHO 2013]. As a consequence, until recently, there were approximately 11,000 health workers, mostly community health workers (n=3883), nurses (n=2844) and doctors (n=333). This equates to 0.5 community health workers, 0.5 nursing officers and 0.05 doctors per 1,000 population compared with the internationally recommended ratio of 2.5 (doctors, nurses and midwives) per 1,000 population. To meet these standards, Papua New Guinea would need to add 13,000 health staff [Malau 2008a].

The health workforce is not distributed according to the needs of the population; while most (87%) of the population live in rural areas, almost half (46%) of the health workers are hospital-based in mostly urban areas [Malau 2008a].

While funding and expenditure for health services have increased over the past few years, there has not been an increase in employment of health workers. This is largely due to salary increases and goods-and-services budget reductions that result in fewer services provided to the growing population.

Further human resource issues include weak standards of patient care, unhealthy workplace practices, run-down and inadequate infrastructure and equipment, and education and training that may not always meet the needs of the health care system [Dawson et al. n.d.]. The tertiary education system is currently unable to produce enough quality health workers [Malau 2008b].

The cholera outbreak was first identified in two coastal villages of Morobe Province in 2009. Over the next two years, the outbreak affected approximately half the provinces, moving along the north coast to the southern coast before affecting the Autonomous Region of Bougainville [Horwood et al. 2011]. There were in excess of 15,000 official notifications and 500 deaths of all ages; however, the true number of cases is likely to be much higher as much of the population did not have health system access, and existing surveillance systems faced important challenges.
National cholera case management guidelines were developed in line with global best practice. Mild or moderately dehydrated patients were treated at community-level rehydration points, while patients requiring intravenous fluids were referred to cholera treatment units and centres. Public health interventions were aimed to increase access to safe water, hygiene and sanitation.

When a health crisis such as a cholera outbreak occurs, strategies for health workforce preparedness are crucial and must be in place to limit outbreak-associated morbidity and mortality [WHO 2010]. Human resource strategies should address distribution of workers to rural areas, supervision, team approaches, remuneration and conditions for rural health workers.

When cholera emerged in July 2009 [Rosewell et al. 2011b], no strategy was in place to address the supply of clinical or allied health workers. The subsequent spread of the disease to neighbouring provinces not only provided significant challenges to health authorities [Horwood et al. 2011] but also provided an opportunity to implement and evaluate novel human resource strategies.

The purpose of this report is to outline 10 challenges that were encountered by health authorities during the cholera outbreak. For each challenge identified, we describe the strategies employed and the lessons learnt to improve management of human resources in future health emergencies.

**Methods**

A qualitative approach was used to review human resource strategies during the cholera outbreak. Data gathering methods included document review, key informant interviews and observation. De-identified information was analysed using an interpretive process informed by clinical and situational knowledge.

This reflective process led to the identification of 10 key challenges, under which results were grouped and further analysed, leading to an understanding of lessons learnt based on the information available. Finally, results were fed back to relevant in-country experts in order to validate the accuracy of the findings. The 10 key challenges will now form the framework for discussion of results.
Case Study: Cholera Outbreak in Papua New Guinea

Challenge 1 – Multisectoral coordination

Multisectoral coordination has been used effectively in Papua New Guinea to address protracted epidemics like the HIV epidemic; however, the influenza pandemic in 2009, followed closely by the cholera outbreak, was the first time that many partners had to work together to respond to a nationally declared acute health emergency.

Strategy – Establish cholera task forces

The National Department of Health (NDoH) demonstrated excellent leadership for the duration of the cholera outbreak. A crucial measure that enabled national leadership was the establishment of a National Cholera Task Force (NTF) that coordinated the required multisectoral response.

The NTF consisted of a general coordinator and five subgroups, each with an operational focal point in the following technical areas: communication, surveillance and laboratory, public health measures, clinical management and infection control as well as logistics. The NTF was replicated at subnational levels with the creation of Provincial Cholera Task Forces, which helped to manage the outbreak, identify gaps and develop cholera response plans for submission to the government for additional funding support.

Lessons learnt – Task forces are effective for outbreak management

Working together, the NTF and Provincial Cholera Task Forces established a clear system of leadership and accountability for cholera outbreak response in each sector, enabled NDoH to demonstrate its overall leadership, and provided a framework for effective partnerships among international and national humanitarian actors in each sector at all levels of government.

While largely successful, several subgroups of the NTF did not have a focal person, which limited the effectiveness in these areas during the outbreak. In provinces where there was a good working relationship between the Provincial Health Office and provincial hospitals prior to the outbreak, coordination generally functioned much better than in provinces where the relationship was poor.

In provinces where the Provincial Health Office and provincial hospitals did not work cohesively prior to the outbreak, collaboration became exacerbated during the crisis, especially in the absence of good leadership. In one province, provincial hospital staff had to perform the activities normally conducted by the Provincial Health Office due to the lack of staff for cholera response.

Through task forces, policy issues were identified and then moved forward through existing systems within health authorities. For example, health authorities were able to take advantage of the momentum of the outbreak to disseminate zinc for cholera management. This may be an initial step towards its institutionalisation.

Aside from pandemic influenza, national and subnational disaster response plans did not consider disease outbreaks such as cholera as a national emergency. As such, responses and coordination were not timely and often required national support and leadership.

The corresponding financial commitments for public health emergencies were not clearly articulated, meaning financial commitments were made at the last moment, resulting in resources being diverted from formal budget commitments, which impacted on planned activities.

Health authorities experienced a lack of clarity in the roles and responsibilities of the different levels of government, making it difficult to implement activities through or with the national disaster.

NDoH experienced significant challenges in seeking support from the Department of Finance and Treasury due to a lack of understanding of public health emergencies. NDoH was required to seek Cabinet approval for emergency funds, as funding from existing health sectoral allocations would be outside of budget appropriations.

Furthermore, the Public Service Commission and the Department of Personnel Management had not understood the nature of operations during public health outbreaks and the complexity of managing 30 different cadres of health workers.

Practice and policy implications – Ensure outbreak task forces coordinate outbreaks

The provision of continued support by the Government of Papua New Guinea to health
The process of conducting risk assessment and the subsequent prioritisation of public health measures is crucial for effectively managing health emergencies, especially in the context of concurrent emergencies.

Widespread mortality, existing systems were unable to measure the impact, thus placing all priority on cholera.

Lessons learnt – Prioritising interventions is crucial following risk assessment

The process of conducting risk assessment and the subsequent prioritisation of public health measures is crucial for effectively managing health emergencies, especially in the context of concurrent emergencies. Greater capacity to respond to health emergencies would be enabled by increasing staffing levels in relevant areas of health emergencies.

The current staff numbers at all levels of government are vastly inadequate for running systems that generate information for risk assessment of health emergencies in Papua New Guinea [Malau 2008c].

For example, without additional staff who can support provincial disease control officers with data management, ongoing surveillance, outbreak detection and verification processes between or during health emergencies, risk assessment will remain challenged and prioritisation of interventions may be based on scant information.

Practice and policy implications – Strengthen human resources and risk assessment capacity

Health authorities may consider strengthening risk assessment capacity and staffing at national and subnational levels. As has been done for clinical staff, health planners may try developing or adopting benchmarks for staff-to-population ratios for effective risk assessment systems.

Establishing a committee to coordinate all health emergencies may be useful to ensure concurrent health emergencies are addressed simultaneously.
rather than prioritising one emergency and not addressing another.

**Challenge 3 – Provincial coordination**

Health emergency coordination is a full-time role during the emergency period. Provincial Health Offices, led by the Provincial Health Advisor, have a mandate to coordinate health emergencies at the subnational level in Papua New Guinea; however, Provincial Health Offices are constantly responding to complex health issues with limited resources and are frequently understaffed to respond to protracted emergencies such as a cholera outbreak. In this context, Provincial Health Advisors may be unable to lead a coordinated response for a protracted period.

**Strategy – Recruit external coordinators**

Two main models of subnational cholera task force coordination were adopted: (1) the cholera task force coordinator was the Provincial Health Advisor, and (2) the coordinator was a respected, effective leader from outside the government system.

The external coordinators had established leadership capabilities and were respected and trusted by local authorities. One external coordinator came from Lutheran Health Services, and another came out of retirement, following a career in public health.

**Strategy – Manage cholera response funding**

Timely cholera control activities were carried out when the Provincial Cholera Task Forces engaged meaningfully with the provincial governments to communicate the implications of cholera in order to facilitate their contribution and support.

The importance of this relationship is paramount, given the significance of the financial contribution that provincial governments can make to cholera response. In addition to financial support, approvals from provincial governments may be required to transfer staff between districts.

**Lessons learnt – External staff can effectively coordinate outbreak response**

Flexibility in the subnational coordination modality was useful, as both models of coordination worked effectively. In the more challenging settings, recruiting coordinators from outside the provincial government system was successful.

The Provincial Disaster Coordinator is not always the most appropriate coordinator of a health emergency. Task forces with active multisectoral participation were most effective.

**Lessons learnt – Quarantined emergency response funds are essential at all levels**

Provinces that maintained a quarantined emergency response fund that could be immediately accessed were able to quickly implement control measures such as mobilising rapid response teams.

The emergency response budget must be able to cover the travel costs of relocated staff and their allowances. The financial accounts of Provincial Health Offices must be acquitted to ensure that task forces have control of the funding allocated for health emergencies and can use it for interventions that they have prioritised.

In one setting, the accounts of the Provincial Health Office had not been acquitted for several years. In this context, NDoH was obliged to disburse emergency funding to the provincial hospital account, taking control of funding away from the Provincial Cholera Task Force. As a result, the funding allocated to the response by the hospital did not correspond to the interventions prioritised by the task force.

**Practice and policy implications – Coordinators can be identified and trained in preparedness**

An evaluation of the coordination models established in responding to the cholera outbreak would facilitate preparedness for the next emergency. Reviewing the degree of multisectoral participation is essential during the “between emergency” phase, as is the identification of ways to maintain the task force.

From a national perspective, a database of experienced coordinators could be maintained to enable their deployment in future health emergencies. Provinces could identify potential health emergency coordinators to provide these individuals with further training and opportunities to participate in health emergency exercises.

A quarantined emergency fund must be maintained for health emergency response at all levels of the health system. Strengthening subnational capacity...
to plan for and manage emergency funds would limit reliance on national support in future.

**Challenge 4 – Outbreak and behaviour change communication**

Outbreaks are frequently marked by unpredictability, uncertainty, confusion and a sense of urgency. Communication failure and delays can hamper outbreak response by delaying control measures, undermining public trust and compliance, and unnecessarily prolonging social and economic turmoil [WHO 2005].

The limited reach of mass media in Papua New Guinea presents significant challenges to communicating standardised information in a timely way that is required during health emergencies. The vast majority of the population live in rural areas, where 29% of households have a radio and 4% have a television, thus limiting the reach of mass media. Furthermore, only about half of the population will complete primary school education, thereby restricting the effectiveness of written materials [NSO 2006].

It is well known that behaviour change during outbreaks can either drive or limit disease transmission. The adoption of personal protective measures is often crucial for limiting disease spread and reducing mortality. Trusted information sources are required to disseminate messages that will lead to behaviour adoption [WHO 2005].

**Strategy – Involve local leaders and existing networks**

During the cholera outbreak, health authorities actively conveyed messages via radio, television and community leaders, such as chiefs in the Autonomous Region of Bougainville. The Secretary of Health served as a strong advocate throughout the outbreak. In an effort to address health information needs and change behaviour at the community level, health authorities communicated messages with loudhailers at communal points and carried out other types of mass gathering communications.

Health authorities also met with village leaders to discuss key personal protective behaviours as well as the barriers to their adoption. The leaders then organised volunteers to communicate the messages to the community.

Health authorities also used the HIV network, made up of faith-based organisations, non-governmental organisations and members of the civil society, for the distribution of key messages and materials to affected and unaffected communities.

**Lesson learnt – Local leaders are important for behaviour change**

It was noted on several occasions that the behaviour changes required of a community during cholera outbreaks are difficult to achieve, even if only required for a limited time (months) while the outbreak is occurring in the community.

Communities are more likely to adopt recommended behaviours following repeated visits and messaging from respected persons such as village leaders, ward councillors, health workers or those organised by such leaders. Anecdotally, one-off visits by persons with loudhailers instructing the population what they should do did not appear to change behaviours during the period of the outbreak.

When health authorities try to achieve behaviour change results without involving the community, the human resource burden is beyond the scope of their capacity.

Behaviour change messages and materials required standardisation, which was best achieved from the central level. Their development could have been timelier and may have benefitted from a pre-existing repository of communication tools.
Practice and policy implications – Involve local leaders and networks in preparedness

Local leaders and networks, including ward councillors, are important in disaster and emergency preparedness planning activities. Behaviour change messages and communication tools for cholera and other outbreak-prone diseases should be standardised at the national level with technical sign-off by NDoH. These could be maintained in repositories at national and subnational levels.

The lack of a media unit with trained personnel in NDoH to disseminate public health information was noted as a deficiency and could be emphasised for the future.

Challenge 5 – National laboratory capacity

In the 1960s, stool culture was conducted at provincial hospital laboratories as well as the national laboratory in Papua New Guinea. More than five decades later, when cholera was reported in West Papua, Indonesia [ProMED Mail 2008], none of the government laboratories, including the Central Public Health Laboratory (CPHL) and the national cholera reference laboratory, had the materials to perform stool culture to identify cholera.

Also, significant human resource challenges existed at CPHL, none more significant than the leadership vacuum created by the Director’s position being vacant for approximately two years, despite the completion of a successful recruitment process.

Strategy – Identify stakeholders and provide tools

In this context, the Pathology Department at the Port Moresby General Hospital offered to perform stool culture to support cholera surveillance if they were given laboratory reagents. Despite their limited staff, the Pathology Department conducted training of provincial laboratories to diagnose cholera for staff of provincial laboratories in two provinces.

Lessons learnt – Timely recruitment of laboratory management is key to functionality

National cholera surveillance worked effectively with only one functioning laboratory in Papua New Guinea. However, the vacant Director position at CPHL could impact significantly on overall laboratory function and the capacity to take on new work (e.g. cholera surveillance) during crises.

Re-establishing diagnostic capacity during outbreaks worked well at the provincial level; however, further support will be necessary to ensure sustainability of the training.

Practice and policy implications – Ensure national laboratory capacity before subnational capacity

National laboratory capacity should be established prior to rebuilding capacity at the subnational level. The draft emerging diseases national plan should be finalised to ensure that cholera is the next disease included in the external quality assurance program.

Reviewing the recruitment processes that occurred for the laboratory Director position may be useful to ensure similar delays are not experienced in future.

Challenge 6 – Surveillance staffing

Prior to the arrival of pandemic influenza A (H1N1) 2009, only one staff member within NDoH was working on outbreak surveillance and response. Despite being an experienced and capable surveillance officer, the burden of conducting outbreak surveillance and response for a country of 6.5 million inhabitants was overwhelming, especially in the context of concurrent emergencies.

Strategy – Establish a command and control centre with temporary staff

In response to this situation, national health authorities established an emergency operations centre and employed two additional staff, a surveillance officer and an administrative assistant, to perform its functions. Similar command centres were established at the subnational level.

Lessons learnt – Effective surveillance systems rely on adequate numbers of trained staff

Timely surveillance of outbreaks is a realistic goal in Papua New Guinea, but it is reliant on adequate numbers of staff. During the cholera outbreak, the command and control centres facilitated the information management component of the health emergency. Given the limited staff and data management capacity at the subnational level, the
national surveillance staff were frequently required to perform provincial data entry.

**Practice and policy implications – Additional staff are required in subnational surveillance**

Surveillance of health outbreaks is not possible without adequate staffing at all levels. For this reason, health authorities established six to eight new positions in the surveillance, risk assessment and outbreak response unit within NDoH at the end of 2011.

Ensuring appropriate training for new staff members will be essential for effective health protection functions within the health authorities.

Provincial health authorities may consider replicating the national surveillance, risk assessment and response structure at the subnational level. Officers in charge of health facilities in rural and remote areas as well as the district disease control officers are crucial to the function of strong reporting systems.

Institutionalisation of incentives for outbreak surveillance, including training, feedback and epidemiological and clinical assistance, should be strongly considered [Paterson et al. 2012] at the local or district level.

**Challenge 7 – Provincial data management capacity**

Cholera surveillance at the subnational level was conducted by provincial disease control officers. In addition to weekly surveillance, however, they were responsible for all other disease control programs (including HIV, TB and malaria), they were involved in bednet distribution for malaria control, they supported outreach immunisation and they investigated acute health events.

The impact of having only one staff member for surveillance during the cholera outbreak was significant. Given the lack of provincial data managers in surveillance and outbreak response, subnational data were rarely shared with national surveillance officers, and the national outbreak profile was frequently based on old and incomplete data. In this context, approximately 50% of health facilities would receive at least one supportive visit from a provincial health officer [Malau 2008a].

Institutionalisation of incentives for outbreak surveillance, including training, feedback and epidemiological and clinical assistance, should be strongly considered at the local or district level.

**Strategy – Borrow staff from other programs**

In the provinces with weak cholera surveillance, the system was characterised by a lack of involvement of those mandated to conduct disease surveillance. However, in provinces where cholera surveillance functioned well, good data managers were borrowed from other programs. In one province, the TB data manager was seconded to the cholera outbreak team for daily data entry, analysis and reporting to the Provincial Cholera Task Force.

During the outbreak, NDoH piloted a new mobile phone-based reporting system that enabled timely data to be received from remote sites (where there is mobile phone network coverage), potentially enabling health authorities and the community to respond earlier and more effectively to outbreaks.

**Lessons learnt – Seconding staff is not sustainable**

Supportive visits to the provinces were sometimes the only way to stimulate the flow of data to the national level, where data entry may have occurred for the first time. Data managers who were recruited to work under the disease control officer during the cholera outbreak were crucial at the time of the emergency. However, because the situation continued for several months, the well-performing health workers returned to their original program, and it took some time to replace them.

Consideration should be given to making the data manager position a permanent one at the provincial level. If data managers were available between outbreaks, they could support the commencement of a weekly reporting system for syndromes of public health importance.

In provinces where there were challenges with the flow of cholera surveillance data, large amounts
of data were sometimes never forwarded to the national level. In one province that reported approximately 600 cholera cases, health care workers at one remote district hospital later reported they had treated and line listed more than 1,000 cases that never made their way into the surveillance system.

The mobile phone reporting system has important human resource considerations in that data are texted by the health care worker at the health facility and are automatically uploaded into a database for automatic analysis. A major advantage of this system is that it does not rely on a provincial health officer to collect and collate the data, as this step is done automatically when the clinician sends the data via SMS. The current staff constraints at the Provincial Health Offices (and NDoH) to collect surveillance data may be overcome in this system, enabling effective response by relevant authorities.

**Practice and policy implications – Mobile phone reporting works with few staff**

Provincial disease control staff require support from data managers and ongoing training. Each provincial hospital could have a designated surveillance focal person to coordinate syndromic surveillance in children and/or adult outpatient departments.

Mobile phone reporting enabled timely surveillance data to be received from remote areas during a cholera outbreak in the context of limited staff in subnational surveillance system. The system has the potential to be rolled out nationally.

**Challenge 8 – Rapid response processes**

Prior to the influenza pandemic, national-level technical support to provincial health authorities for outbreak investigations was provided on an ad-hoc basis by the one surveillance officer from NDoH, with little technical collaboration from other disciplines within the health authorities.

**Strategy – Formalise rapid response teams**

The cholera outbreak was the first time NDoH formally established a rapid response team for a disease outbreak. This is a promising initiative that should be supported with appropriate materials and training. Sending young professionals to field epidemiology training programs in India has increased the number of capable staff available for conducting outbreak investigations.

**Lessons learnt – Formalising the rapid response team was simple and effective**

Once the Senior Executive Management of NDoH decided to formalise the national rapid response team, action was swiftly taken. Within weeks, the national rapid response team had completed its first investigation, confirming cholera and micronutrient deficiencies associated with high mortality among internally displaced persons. In addition to the technical support provided in field epidemiology, assistance was provided to provincial authorities in outbreak communication and water, sanitation and hygiene.

**Practice and policy implications – All provinces need a trained rapid response team**

Provincial health professionals who return from international field epidemiology training programs should formalise rapid response teams to strengthen outbreak investigation and response capacity at the provincial level. Human resource targets such as a fully adopted national workforce plan and at least one trained field epidemiologist per 200,000 population are useful considerations [Ijaz et al. 2012].

Monitoring the creation and training of rapid response teams remains an important feature of implementing the national health emergencies plan.

**Challenge 9 – Initial clinical surge capacity at cholera treatment centres**

Due to the high initial case-load experienced by provincial hospitals and the limited hospital infrastructure for maintaining essential services, external treatment centres were established within
hospital grounds. Effective case management during cholera outbreaks requires a large number of trained clinical staff [Dawson et al. n.d.], with community intervention frequently required.

Unfortunately, most of the provincial hospitals lacked the necessary clinical employees to run the external treatment centres for 24 hours a day, seven days a week. In the context of the human resource crisis in Papua New Guinea [Dawson et al. n.d.] and a “new disease” for clinicians, ensuring such services was extremely challenging.

Strategy – Rotation of staff across the province
Hospitals frequently organised rotations of clinical staff from district health facilities to come to the provincial capital to work in the cholera treatment centres. In this way, sufficient clinicians were available to manage cases, and the centres could be used as a training centre for district staff who worked in facilities where cholera cases were yet to present. However, this strategy leaves district facilities understaffed or completely without staff for extended periods, due to the limited capacity to back-fill positions.

Lessons learnt – Leadership and training enable effective staff rotation policies
In the context of inflexible systems for recruiting clinical staff as outbreak surge capacity, the rotation of district staff appeared to be a successful strategy for ensuring adequate case management, training staff and preparing staff from unaffected districts.

However, managing the available human resources to staff cholera treatment centres, mobilising response teams to affected rural areas and maintaining routine services in rural facilities was a complicated juggle.

... managing the available human resources to staff cholera treatment centres, mobilising response teams to affected rural areas and maintaining routine services in rural facilities was a complicated juggle.

in effectively managing cholera cases but also in running a treatment centre. Running the centre involved activities such as rostering, clinical audits to understand drivers of mortality, ongoing training, cleaning, provision of water and sanitation, procurement and stocking, infection control and mortuary services.

The strategy was less effective in locations where existing leadership was weak. In such locations, stakeholder technical assistance was rejected, financial resource allocation did not correspond to interventions prioritised by the provincial task force, and the rotated district staff did not always perform the activities they were recruited to perform.

During the later stages of the outbreak, experienced cholera treatment centre teams from the first-affected provinces were recruited to work in cholera treatment centres in other provinces with high mortality.

This was effective for improving the management of cases and the treatment centre during the period the team was on the ground. However, it did little to improve the situation in the longer term, as opportunities to share the expertise of clinical staff from previously affected provinces were not seized and not much was done to improve systems.

Staff rotation also enabled clinical staff to witness their colleagues treating cases of this “new disease” and not getting sick or dying. In this way, experienced staff were able to reassure colleagues who had fled their health facilities for fear of the disease.

Cholera outbreaks, like the one in Papua New Guinea, can be expensive if they carry on for months in settings with limited infrastructure. The
cholera treatment centres were initially staffed with clinicians, infection control officers and security guards, at a cost of approximately 30,000 Papua New Guinea kina per month.

Practice and policy implications – Outbreak preparedness includes surge capacity strengthening

Cholera is a diarrhoeal disease that may cause outbreaks that stretch the capacity and resources of the health system. While capacity needs may vary during and between outbreaks, cholera should be treated the same as other outbreak-prone diseases and (where possible) should be integrated into routine hospital services.

Contact lists of trained clinical staff must be kept updated. Preparedness for the next waves of cholera outbreak or future health emergencies could include identification of the minimum number of staff to operate outbreak management units, identification and documentation of case-load thresholds to trigger additional recruitments, ongoing training and exercises to ensure staff competency and safety, and preparation of contingency arrangements such as memorandums of understanding with key stakeholders for staffing needs. Retention of trained and/or experienced staff on the rosters for surge capacity would be a useful consideration.

Practice and policy implications – Integrate cholera into existing services

The national referral hospital and the provincial hospitals in Papua New Guinea do not have established isolation wards. Where cholera treatment centres were established to deal with the high case-load, exit strategies proved very difficult. Hospitals did not wish to shut down the cholera treatment centres in case another wave of the outbreak occurred and there was no isolation facility to receive the patients.

However, cholera has been a protracted emergency in some provinces, with transmission occurring for more than one year. Ways to integrate cholera into the routine business of hospitals and to manage associated staffing, costs and other issues are currently being considered across the country.

While capacity needs may vary during and between outbreaks, cholera should be treated the same as other outbreak-prone diseases and (where possible) should be integrated into routine hospital services.

Challenge 10 – Community access to rehydration

The health system in Papua New Guinea faces significant challenges in providing services to the rural majority [Foster et al. 2009]. Recent decades have seen a decline in the number of functional aid posts that are staffed with health workers. In this context, the timely establishment of rehydration points at the community level is crucial for limiting mortality associated with cholera outbreaks.

Strategy – Involve unpaid volunteers

When cholera struck remote areas with aid posts, community health workers were typically responsible for managing cases, with volunteers from the community frequently assisting with case management and infection control. In some urban areas, volunteers were paid to run the rehydration points; in others, they performed this function without remuneration.

Lessons learnt – Rosters and volunteers are essential for staff rotation in remote settings

In settings where health care workers were present, unpaid volunteers often provided safe water to the makeshift treatment centres, monitored intravenous flask needs of patients in their homes prior to moving to makeshift treatment facilities, and prepared rehydration solutions for patients as well as chlorine solutions for infection control. Such activities enabled health care workers to catch up on much-needed sleep during intense periods of transmission in remote areas.

To complement the important contributions of volunteers, district health authorities developed rosters of staff from nearby facilities to ensure that
clinicians shared shifts with community health workers during periods of intense transmission. In settings where strong local leadership was absent, a functional roster system was a challenge and staff were frequently overburdened, placing patient lives at risk.

In one urban location, subsequent to the intense phase of the outbreak when only small numbers of cases were presenting to the provincial hospital, 15 rehydration points strategically located around the community remained operational, each staffed by three paid volunteers.

It should be recognised that there is generally an expectation in the community that volunteers will be paid for their time, which could be seen as a relatively low-cost way of achieving outcomes in the context of an understaffed health system.

Practice and policy implications – Volunteers require a flexible approach

Health authorities may consider reviewing the different approaches taken to recruit and remunerate community volunteers, with a view to identifying the strategy that works best for a given situation. This may facilitate community involvement in outbreak response and ensure support for clinical staff in a cost-effective, sustainable way.
DISCUSSION

Papua New Guinea is strengthening its capacity to identify, assess and respond to health emergencies in line with requirements of the International Health Regulations (IHR). To support the implementation of IHR, the country has adopted components of the Asia Pacific Strategy for Emerging Diseases, which outlines areas of achievement relating to health emergencies. Key to this area is the development of a national health emergencies plan, which has been recently drafted by health authorities.

To achieve the objectives of the national health emergencies plan, capable public health professionals are needed for the timely, effective response to public health emergencies at national and subnational levels. As a result, objectives of the national health emergencies plan are best achieved if the required human resources are clearly identified and articulated in the national human resources plan.

Clinicians are the backbone of primary health care in Papua New Guinea and include: community health workers, health extension officers, nurses and doctors. They are essential in the implementation of mortality-reduction interventions during outbreaks, and for ensuring the ongoing function of essential health services. For these reasons, mapping and projecting population health needs in terms of clinical staff has been prioritised in Papua New Guinea.

However, a variety of cadres of public health professionals are required for health emergency planning, preparedness and response. They include officers trained in environmental health, health promotion, logistics, communications, laboratory diagnosis and surveillance, data management, field epidemiology as well as monitoring and evaluation.

The creation of a cadre of trained field epidemiologists to monitor disease trends, provide intelligence to those conducting risk assessments, inform decision-makers about potential disease threats and guide the response during a public health emergency is essential.

The Papua New Guinea response to cholera demonstrates system inadequacies, including the systems that identify, develop and make projections on human resource requirements for health. Generally, locations that functioned well prior to the epidemic responded better to it.

To achieve the objectives of the national health emergencies plan, capable public health professionals are needed for the timely, effective response to public health emergencies at national and subnational levels.

Pre-service training, opportunities for ongoing training, increased supervisory visits, production, utilisation of all cadres of public health professionals, supervision and support, financial support and incentives, housing and training in supervision and outreach have all been previously identified as areas for strengthening [WHO 2010].

Developing human resource targets is important for achieving desired health system outcomes. The target of at least one trained field epidemiologist per 200,000 population is an example of benchmarks that should be established for Papua New Guinea [Ijaz et al. 2012]. However, there are a number of other cadres of public health professionals that are required for emergency response, all of which are currently in limited supply and would also benefit from such targets.

These cadres should also feature in the mapping and projections of public health professional needs in any fully adopted national workforce plan and may be a consideration for targets relating to their ratio to the population. Registration systems for all health professionals (clinical and public health) will provide more detailed data regarding the workforce.
CONCLUSION

The human resources for health context in Papua New Guinea made emergency response a challenge during the cholera outbreak. While the outbreak response was generally well managed, improvement to human resource systems prior to the next emergency will enable a more effective response.

Population needs for all public health professionals involved in health emergency preparedness and response should be mapped and planning should be implemented to increase the numbers in relevant areas. Human resource planning should be integrated with health emergency planning.

It is essential to maintain and strengthen the human resource capacities and experiences gained during the cholera outbreak to ensure a more effective response to the next health emergency.
REFERENCES


WHO WPRO 2010, Asia Pacific Strategy for Emerging Diseases (APSED, 2010), World Health Organization.
THE KNOWLEDGE HUBS FOR HEALTH INITIATIVE

The Human Resources for Health Knowledge Hub is one of four hubs established by AusAID in 2008 as part of the Australian Government’s commitment to meeting the Millennium Development Goals and improving health in the Asia and Pacific regions. All four Hubs share the common goal of expanding the expertise and knowledge base in order to help inform and guide health policy.

Human Resource for Health Knowledge Hub
*University of New South Wales*
Some of the key thematic areas for this Hub include governance, leadership and management; maternal, newborn and child health workforce; public health emergencies; and migration.
www.hrhhub.unsw.edu.au

Health Information Systems Knowledge Hub
*University of Queensland*
Aims to facilitate the development and integration of health information systems in the broader health system strengthening agenda as well as increase local capacity to ensure that cost-effective, timely, reliable and relevant information is available, and used, to better inform health development policies.
www.uq.edu.au/hishub

Health Finance and Health Policy Knowledge Hub
*The Nossal Institute for Global Health (University of Melbourne)*
Aims to support regional, national and international partners to develop effective evidence-informed national policy-making, particularly in the field of health finance and health systems. Key thematic areas for this Hub include comparative analysis of health finance interventions and health system outcomes; the role of non-state providers of health care; and health policy development in the Pacific.
www.ni.unimelb.edu.au

Compass: Women’s and Children’s Health Knowledge Hub
*Compass is a partnership between the Centre for International Child Health, University of Melbourne, Menzies School of Health Research and Burnet Institute’s Centre for International Health.*
Aims to enhance the quality and effectiveness of WCH interventions and focuses on supporting the Millennium Development Goals 4 and 5 – improved maternal and child health and universal access to reproductive health. Key thematic areas for this Hub include regional strategies for child survival; strengthening health systems for maternal and newborn health; adolescent reproductive health; and nutrition.
www.wchknowledgehub.com.au
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