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Knowledge and power in policy-making for child survival in Niger

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ABSTRACT

Calls to enhance the use of scientific evidence in international health and development policy have increased in recent years; however, analytic frameworks for understanding evidence use focus narrowly on scientific research and were created using data and observations nearly exclusively from Western countries. We examine processes of health policy development in a case study of Niger, a low-income West African country that adopted integrated community case management of childhood illness (iCCM) beginning in 2007, resulting in measurable declines in child mortality. Data collection included in-depth interviews with policy actors in Niger (N = 32), document review (N = 103) and direct observation of policy forums (N = 3). Data analysis used process tracing methodology and applied an Aristotelian definition of "knowledge" as 1) *episteme* (facts), 2) *techne* (skills) and 3) *phronesis* (practical wisdom), while also using a critical perspective to understand issues of power. We found sharp differentials in policy-makers' possession and use of codified forms of knowledge (*episteme*), with Nigerien policy officers' access highly mediated by actors at international agencies. Government policy-makers possessed skills and capacities (*techne*) to negotiate with donors and deliberate and weigh conflicting considerations; however they lacked capacity and resources to formally evaluate and document programs and thus reliably draw lessons from them. Practical wisdom (*phronesis*) emerged as key to the iCCM policy enterprise, particularly among Nigerien government actors, who used logical and ethical arguments to make decisions later found to be critical to iCCM's success. While codified knowledge confers power on members of policy discussions who can access it, this represents only one form of knowledge used in the policy process and perhaps not the most important. Future research on evidence-based policy should use broader definitions of evidence or knowledge, examine on how power conditions the use of knowledge, and examine challenges specific to low-resource policy environments.

1. Background

Evidence-based policy-making is believed to produce higher quality policies and when it comes to child survival policy, the stakes are incredibly high: each year nearly 6 million children under 5 die, nearly all in low- and middle-income countries (LMICs), with the three leading causes of death being pneumonia (15% of deaths), diarrhea (9%), and malaria (7%) (Liu et al., 2012; You et al., 2015). To increase access to prompt and effective treatment of childhood illness, global-level policy-makers developed integrated community case management of childhood illness (iCCM), an evidence-based strategy to provide life-saving care for these three diseases (Young et al., 2012). To date, nearly all African countries have adopted some form of iCCM policy (Rasanathan et al., 2014).

In recent years, calls have increased to move toward evidence-informed decision-making in global health and public policy following observations in the 1990s and 2000s that policies did not reflect evidence as much as they could and that stores of useful research were going to waste (Davis and Howden-Chapman, 1996; Hanney et al., 2003; Lavis et al., 2002). Concurrently, new directions are emerging in the types of knowledge considered relevant to health policy making, with a growing consensus that earlier conceptions of evidence, defined "statistical inference about events in populations that are studied prospectively," were too narrow and

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should be expanded to include observational and qualitative studies and health policy and systems research (HPSR) (Black, 2001; Fox, 2005; Sturm, 2002). However it is unclear the extent to which these recommendations, alongside global initiatives such as WHO's Evidence-Informed Policy Network (EVIPNet) and Alliance for HPSR, among others, which produce policy briefs, research syntheses and analyses of policy options, have achieved the broader goal of informing health policy decision-makers in LMICs (Rosenbaum et al., 2011).

Systematic reviews drawing mainly on studies from Western countries have identified numerous barriers to the use of evidence in policy-making, including nonexistent or low-quality evidence (Oliver et al., 2014a; Orton et al., 2011), lack of contact between policy-makers and researchers (Innvaer et al., 2002; Orton et al., 2011) and policy-makers' insufficient research skills or awareness of research findings (Oliver et al., 2014a; Orton et al., 2011). Meanwhile the public health and public policy literature are just beginning to explore the use of evidence in policy-making in LMICs and identify specific challenges inherent to low-resource settings (Rodríguez et al., 2015b; Greenhalgh and Wieringa, 2011). While policy-makers in LMICs nearly universally cite evidence as being crucial to making good policy decisions (Burchett et al., 2012), existing studies tend to emphasize the under-use of relevant evidence or data to inform decision-making (Gupta et al., 2003) or specific barriers to using research, echoing the barriers noted above for Western countries but also including political, budgetary or bureaucratic obstacles (Aaserud et al., 2005; Mubyazi and Gonzalez-Block, 2005; Woelk et al., 2009). In addition to problems of under-investment in research, governments in LMICs also have fewer human resources to devote to policy development processes, quantitatively and often qualitatively, resulting in lesser capacity to assess evidence and incorporate it into policy (Ogundahunsi et al., 2015; Olivier de Sardan & Tidjani Alou, 2012).

Existing theoretical and empirical work on evidence-based policy-making has focused, implicitly or explicitly, on uptake of peer-reviewed academic research evidence, a narrow definition of knowledge attributed to the rationalist epistemological stance found in evidence-based medicine. Whereas policy-makers themselves interpret "evidence" in a broader sense, including forms of knowledge beyond research evidence strictly construed (for example practical experience and tacit knowledge), the public health literature as yet mainly has not, leading to under-emphasis on sociological aspects of knowledge use in policy development and particularly the role of power (Greenhalgh and Wieringa, 2011; Oliver et al., 2014b). This is less true of relevant work coming out of other literature, such as sociology, where the contested meanings of "evidence-based policy" are frequently interrogated, for example around climate change policies (Pearce, 2014; Pearce et al., 2014), and in Science & Technology Studies, where theories of "co-production" have been proposed to examine how technical experts and society interact to produce knowledge, in ways that are inextricably linked to societal mechanisms of organization and control (Jasanoff, 2006). With such considerations in mind, analysts have called on researchers to adopt a critical perspective and examine power dynamics in the use of evidence in policy development in LMICs (Behague et al., 2009; Greenhalgh and Wieringa, 2011; Shiffman, 2014). Greenhalgh and Weiringa additionally propose using an Aristotelian view of knowledge or evidence with three components: *episteme* (facts or explicit knowledge, including notably research evidence), *techne* (skill or practice) and *phronesis* (situation-specific practical wisdom). *Phronesis*, perhaps the slipperiest concept, has traditionally been translated as "prudence," and is sometimes defined as the ability to apply general rules to particular situations; it involves ethical and practical considerations about which ends to pursue (Montgomery, 2006).

In this article we present a case study of the use of evidence in the policy development process for iCCM for child illness in Niger, a low-income West African country which historically has had among the world's highest rate of child mortality and was one of the first African countries to adopt iCCM. Following Greenhalgh and Weiringa, we critically examine the three types of knowledge discussed above and explore how these were used during policy development, with a particular attention to power throughout the policy-making process. Finally, we summarize our findings, discuss lessons learned and suggest future directions for research on evidence-based policy making in LMICs.

2. Methods

This study uses case study methodology, a form of research useful for reconstructing processes holistically to examine the processes at work (Pope et al., 2000), to identify the sources of knowledge in policy-making in Niger and explain how power conditioned their use. Our sources of data were in-depth semi-structured interviews, a document review and direct observation of policy forums, all techniques useful for unraveling complex situations and teasing apart inter-related causal mechanisms. These methods and data sources are appropriate to studies of national-level policy made and, with the exception of direct observation, commonly used in studies on the use of evidence in policy-making (Hanney et al., 2003).

Data collection took place in Niamey, Niger from February to August 2012 (Table 1). We consulted 103 documents related to iCCM policy, performing close reading and systematically extracting information on documents' authorship, purpose, technical documentation, and key arguments and justifications put forward. Interviews were conducted with 32 key informants (28 in-country) involved in iCCM policy development, identified via the document review and snowball sampling; the average length of interviews was 57 min. Interviews were conducted mainly in French and transcribed in-country. Key informants were asked about the origins of iCCM policy; key events in the policy process; and the use of scientific evidence, data, experiential knowledge, and other types of information consulted when designing the strategy. Lastly we observed three national policy events on issues related to iCCM and child health in Niamey, namely national-level workshops in which policy-makers validated aspects of community-level child health care (such as the minimum package of care) or discussed expanding care in various ways (for example by increasing the availability of neonatal care or allowing home malaria care). Observing these events allowed us to witness interviewees and other policy actors interacting in real-life situations of policy negotiation, conditions propitious for identifying controversial issues and revealing power relations (Hunsmann, 2012).

Data analysis was based on process tracing, a technique useful for combining multiple sources of information to "minimize bias, establish common patterns of causality, and reveal social and political processes" (Pope et al., 2000; Shiffman et al., 2004). Drawing upon all data sources, we used process tracing to produce a sequential description of the policy-making process with "thick" detail and attention to sequencing (Dalglish et al., 2015), so as to draw causal inference based primarily on qualitative data (Collier, 2011). Specifically, we took a national (Nigerien) perspective of knowledge systems with global reach, using process tracing to 1) compile a timeline of policy development (1960s-2013), 2) categorize and track the use of different types of knowledge across actors and over time, and 3) demonstrate patterns of directionality in evidence sharing among actors, looking at citations and accounts of how evidence moved through the policy network (Lee and Strang, 2006). [The first author] applied thematic coding to

Table 1
Primary data collection.

Document review	*N*
Official government policy	22
- National policy documents & strategies	
- Implementation tools (training manuals, operational plans)	
"Gray" literature	29
- Draft reports; internal reports and memos	
- PowerPoint presentations from meetings, workshops, consultations, etc.	
- Funding requests	
- Field evaluations & midterm reports	
Scientific data & evidence	31
- Articles from the scientific literature	
- Doctoral dissertations	
- Statistical surveys	
- Action research studies	
Other	21
- Public communications, websites, fact sheets	
- Declarations of support by donors, partners, etc.	
- Legal documents and statutes of broader significance	
TOTAL	103
Semi-structured interviews	
Government sector	19
- Senior and mid-level Ministry officials in departments of reproductive and child health, community health, health education, nutrition, etc.	
- Officials at regional health offices and the national malaria program (PNLP)	
- Clinicians at national reference hospitals and maternities & IMCI trainers	
- Ministry of Communication (community radios program)	
Donors & technical assistance	10
- WHO-Niger program officers (child/reproductive health)	
- Unicef–Niger program officers on child survival, health communications, etc.	
- USAID staff working on BASICS, BASICS II and AWARE-RH programs	
NGOs & civil society	3
- Country staff at international & local development NGOs	
- Members/leaders of health worker professional associations	
TOTAL	*32*
Direct observation of policy-making forums	
- Validation workshop to approve the new minimum package of care for health posts (Niamey, June 2012)	
- National workshop to share results of a pilot program on community-level neo-natal care (Niamey, July 2012)	
- Workshop on home malaria care (Niamey, July 2012)	
TOTAL	3

interviews and notes from participant observation based on theoretical categories extracted from the literature on evidence use in health policy and public policy-making, to examine the uses of knowledge; processes such as learning, argumentation, and framing; and power dynamics in policy-making (Oliver et al., 2014a; Orton et al., 2011; Weiss, 1979), using NVivo 9 (QSR, 2010). We also included emergent ("in vivo") codes on different types of knowledge (e.g. values and ideas) and uses of knowledge and evidence in the policy sphere. Findings were analyzed iteratively via discussion (written and oral) among team members, by checking interpretations and developing themes emerging from various codes. Finally, these intermediate results were further re-examined by categorizing types of knowledge using an Artistotelian framework and applying a critical perspective (i.e. drawing attention to power dynamics) to events occurring throughout the policy process (Greenhalgh and Wieringa, 2011). This research was financed and largely carried out by researchers from Western institutions and thus necessarily reflects an outside perspective; we attempted to enhance validity by presenting preliminary results at a workshop in Niamey in October 2012 ("member checking"), discussing emerging findings with local researchers, and extending our critical reflection to ourselves (Creswell, 2007).

This research was part of a larger multi-country study of iCCM policy formulation in Africa (Bennett et al., 2014); it was deemed exempt from ethical review by XXXX and was approved by Niger's national ethics committee and Ministry of Higher Education and Scientific Research.

3. Results

Child survival has historically been a priority in health policies in Niger, dating from the rural health teams of the late 1970s to mid-1990s and then Integrated Management of Childhood Illness (IMCI), a facility-based strategy implemented nationwide beginning in the late 1990s. Given persistently high child mortality, frequently at home or in the community, policy discussions turned increasingly to community-level care for childhood illness. In April 2005, representatives of Niger's Ministry of Health (MOH) participated in a regional meeting sponsored by USAID's AWARE project in Dakar to learn from a Senegalese project on community-based management of pneumonia (AWARE, 2008). Later that year partners came to Niger on a follow-up visit to integrated community-level care of malaria, diarrhea and pneumonia with MOH officials, and shortly thereafter a field trial of iCCM was organized in Madarounfa district. The exercise was led by MOH with training manuals and other implementation tools developed in partnership with AWARE, WHO and Unicef. Scaling-up came after a positive mid-term review in January 2007 and implementation funding arriving in October 2007, under a co-financing agreement between the Canadian international development agency and Unicef (AWARE, 2008; Hamsatou, 2008). Implementation was complete in all health districts by end 2011, with subsequent assessments generally finding good quality of care (Bensaid and Gali, 2009; Seidou, 2008), with iCCM contributing to recent reductions in child mortality in Niger (Amouzou et al., 2012). A detailed description of events in the policy-making process for iCCM in Niger has been provided elsewhere (Dalglish et al., 2015).

We found that Aristotle's three types of knowledge were best examined in dyads, as their uses were not neatly separable. In this section we examine three key themes in policy-makers' use of knowledge: 1) utilizing international research evidence (episteme/techne), 2) finding common-sense solutions (techne/phronesis) and 3) "informal" health systems and policy research (phronesis/episteme).

3.1. Utilizing international research evidence (episteme/techne)

Scientific evidence was seen as the underlying basis for iCCM: policy-makers uniformly agreed that the latest research was the pedestal and starting point of the policy process. Policy actors belonging to different groups (Ministry staff, public sector clinicians, international technical assistants, local and international NGO staff members) equally shared this viewpoint; however they did not have equal access to the scientific literature and therefore had different relationships to the knowledge contained therein. While policy actors at international technical assistance agencies had relatively good access to this literature, Nigerien government actors' access was limited by material constraints and language barriers and they relied on partner agencies as intermediaries to reach the information in scientific articles.

For their part, Nigerien government officials relied on international norms, directives, and technical guidelines to synthesize and represent the latest and best scientific research, and based their policies on them after adapting them to country context:

> "We base ourselves on international norms. Because there are international norms that come, international directives that come. And we, we take them and adapt them to our context." (*NIG-2012-5-21, mid-level child health officer, MOH*)

Additionally, policy actors at international agencies such as WHO and Unicef facilitated the dissemination of guidelines by introducing them to “important professors and influential people” in a position to lead discussions on child survival policy (*NIG-2012-8-2, international consultant*).

Scientific studies of any kind were rarely spontaneously evoked by government respondents, likely reflecting government actors' limited access to the scientific literature. As one Nigerien respondent who had worked both at MOH and an international agency said:

> “With scientific data, it's a continual learning process. At any time I can get the information [here at the international agency]. But when I was at the Ministry from 2000 to 2004, internet was not so advanced. I have better access to information here than there. Science evolves.” (*NIG-2012-6-4, child health specialist, international agency*)

Nonetheless, not all available research evidence was utilized, including a strong body of qualitative socio-anthropological research on the Nigerien health system and child health, much of it in French (Kafando et al., 2011; Körling, 2011; Oumarou, 2013; Ousseini, 2011). Indeed, the only studies specifically mentioned by any respondent were ones appearing in a *Lancet* series on child survival (Venis, 2003) and one on neo-natal survival (Horton, 2005). One Nigerien government clinician said,

> “It was only through the *Lancet* that we came to know that to save the life of a newborn, [sophisticated material] is not necessary … Well, I think that it has been very influential; it was a ‘cry from the heart’ as we say, and it was an awareness raiser at the global level about massive newborn mortality.” (*NIG-2012-6-7, government clinician*)

French-language summaries of articles such as these were circulated by WHO and Unicef, for example the 2003 *Lancet* series on child survival, which Unicef “didn't [translate] … but took elements of” (*NIG-2012-6-16, senior manager, international agency*):

> “Geneva always shares with us whenever there are publications in the *Lancet*, we follow up and we make short summaries to be shared with [the ministry].” (*NIG-2012-5-30, senior manager, international agency*)

In this way, access to the scientific literature was mediated by international agencies, whom government actors perceived as legitimate authorities to interpret it. With respect to iCCM, government actors expressed strong faith in the validity of the global-level technical work that went into creating the strategy, which they said obviated the need for duplicative research in Niger:

> “The role of evidence is that there is no point reinventing the wheel. These are things that are immediately applicable because they have proven their worth. They do not need to be tested anymore and this makes you move faster to achieve a reduction in child mortality and morbidity … It's already done, so now we must consume.” (*NIG-2012-6-7, clinician, government sector*)

In terms of interpreting and analyzing research, government documents such as written strategies, working papers and implementation tools frequently cited no scientific publications or referred to the research only vaguely (“according to a Kenyan study”) (Hamsatou, 2008; PNLP, 2012; Zataka, 2005). Although poor citation habits do not necessarily indicate a failure to understand or utilize research results, government documents did not suggest a strong familiarity with the scientific literature other than indirectly (i.e. via international technical guidance).

Government actors' access to the scientific literature was limited not only for material reasons (poor internet access, lack of access to paid article databases) but also due to language barriers (insufficient English). Among Nigerien (and other francophone) actors at international agencies, English was also occasionally a barrier, though the latter were surrounded by English-speaking colleagues with whom they could discuss the latest findings. Despite these obstacles, higher-level government officials stayed current on the latest research by attending international conferences and meetings, with their participation often arranged for by international partners (*NIG-2012-6-16, senior manager, international agency*). As such, government actors' access to research evidence was mediated more or less overtly, as at a Sanofi-Pasteur-sponsored national workshop on home-based malaria care, featuring favorable presentations on the safety and efficacy of their product artesunate amodiaquine (ASAQ), with product samples prominently displayed along the speakers' platforms and dissemination of pamphlets and other promotional materials to all participants (Niamey, July 2012, direct observation).

3.2. Finding common-sense solutions (techne/phronesis)

If scientific evidence was claimed to be the basis of iCCM by all actors, major policy decisions seemed more often to be animated by arguments based on logic, common sense or moral imperatives such as the necessity of acting on imperfect information when children's lives were at stake. In early policy discussions, for example, there was widespread resistance within MOH to allowing community health workers (CHWs) with only a few months' clinical training to prescribe antibiotics. In both government and international agency offices, the most influential holdouts to task-shifting policies were medical doctors (many trained abroad) who claimed children deserved better care than CHWs could provide; they also possessed direct clinical knowledge of the difficulties of correctly diagnosing conditions requiring antibiotics. Their initial resistance to iCCM appears to have been overcome by “common-sense” arguments:

> “‘This is second-rate medicine, low-grade medicine. You are going to kill children, etc.’ After having said all this, we were told the number of children who die every day in the community. We think we see pediatric cases, in fact we don't see anything: 80% of children die in the community … Hey! Are you scratching your head, so, doctor, will you be the one to provide care for all these children? No? Will you let them die? No. So, what will you do? Discussions on the issue are now starting.” (*NIG-2012-6-16, senior manager, international agency*)

> “The main argument for all these great professors was to say,‘You are working in a facility that is well equipped with equipment, staff and material, but presently where do children go to seek care?’ Not necessarily in town.” (*NIG-2012-8-2, international consultant*)

Indeed both Nigerien and international policy actors used logical arguments to connect the problem of child mortality in Niger to the solution of integrated community-level care. Nigerien respondents frequently mentioned the country's large geographic size and small number of health facilities to explain why children “died at home” and evoke the need to shift tasks to CHWs. One respondent said,

> "If one says, it is necessary that pediatricians treat children, how many can he treat? [Laughs] It is not possible, the country is large and there is I believe 40% of the population who are children. … But with task shifting, with small skills, they can save many lives." (*NIG-2012-7-11-2, IMCI officer, government sector*)

Practical, real-world policy argumentation was also evidenced when Nigerien policy-makers' mentioned relevant policy successes in countries in the sub-region. Government respondents frequently evoked policy innovations in countries with similar epidemiological and socio-cultural profiles, as these provided a model of success and allowed for sharing and adaptation of implementation tools and training modules. Respondents mentioned examples from Mali, Benin, Togo and especially Senegal, sometimes equating them in importance to research evidence in informing policy development:

> "There was scientific evidence showing that you can treat certain diseases at the community level. And there were other countries' experiences. Because Niger went to Senegal to see how it worked." (*NIG-2012-5-17-2, head of child health, government*)

These processes went beyond mere imitation. Senegal's pilot project, showcased during the AWARE workshop in 2005, was one of the first in sub-Saharan Africa to use community-level treatment of pneumonia – yet inspired Nigerien officials to propose an integrated curative package including the three main causes of child mortality, which would form the basis of pilot in Madarounfa in 2006-07:

> "Every country presented what they intended to do at community level. So, Niger stated that it will not limit itself to [pneumonia] case management at community level, but will rather implement IMCI as it is learnt at the clinical level and implement it at the community level. So the process should be the same, all the symptoms will be observed." (*NIG-2012-5-18, clinician, government sector*)

3.3. "Informal" health systems and policy research (phronesis/episteme)

Nigerien government actors paid close attention to operational details in child health programming, as was evident during direct observation of policy-making forums, which included much discussion of motorcycles, bicycles, donkeys and carts to transport health workers and supplies; specifics about how censuses and data collection activities would operate; and appropriate incentives for health workers and other operational actors. In this way, policy actors chewed over details of the Nigerien public health system, including its infrastructure, human resources, policy imperatives and ways of functioning to find the best fit between iCCM, a strategy created at the global level, and the Nigerien context. However, policy-makers' experiential knowledge of the health system, while ample, remained informal and in many ways incomplete, limited by the boundaries of personal experience.

First, lower-level health workers, those most intimately familiar with the operational environment, were often present but usually silent at policy forums, perhaps intimidated by the dense scientific presentations that tended to precede opportunities for comment. Though of course many higher-level officials had previous field experiences on which they could draw, the practical knowledge of CHWs was rarely tapped to inform policy making. This exchange observed at a workshop on extending iCCM to newborn care was typical: a presiding officer, noting "quite the army of pediatricians and gynecologists who have spoken up till now," called upon the group of CHWs present to comment. One rose and mumbled a few words, prompting another attendee to ask, "What did you think of the project?" "Well, there were a lot of problems related to postnatal care and delivery," the lower-level worker replied, "but we also saw a lot of progress." No further details were sought after (*July 2012, direct observation*).

Discussions of operational details were rarely documented or recorded, making them an almost purely oral form of knowledge captured mainly by direct observation of policy processes, but also mentioned in interviews with policy-makers. The lack of documentation of previous health strategies compounded the difficulty of drawing historical lessons from them. Niger was an early leader in community health programming, and for more than two decades ending in the 1990s deployed a small army of *secouristes-hygiénistes* (first aid workers) dispensing chloroquine and other basic medicines, though the program was never comprehensively evaluated. Respondents in our study were well aware of the *secouristes*; however, they provided a multitude of non-mutually exclusive reasons for the ultimate failure of this policy, including a lack of incentives for first-aid workers (*NIG-2012-6-8-1, NIG-2012-5-30*); the absence of monitoring and supervision (*NIG-2012-7-3-3*); difficulties in replenishing drug stocks (*NIG-2012-6-8-2*); changes in the health system with the introduction of health posts; and lastly, the poor performance of first-aid workers (*NIG-2012- 7-3-1, NIG-2012-7-26*). The lack of any formal evaluation has consigned the experience to "the dustbin of history," in the words of a participant in the workshop on home malaria care (*July 2012, direct observation*).

Operational research continues to be a challenge for government programs, as routine health information systems are poorly functioning and almost exclusively paper-based and rigorous evaluation data are rarely systematically collected or analyzed. This situation was in evidence at a national workshop in July 2012 presenting results of a pilot project of iCCM for newborns funded by Unicef but undertaken by ministry officials, during which numerous attendees bemoaned the failure to include a baseline or reference group and subsequent impossibility of drawing meaningful conclusions. "There were problems with respect to the data, it must be said; we have nothing to hide," recognized one official linked with the research (*NIG-2012-6-07, clinician, government sector*). Still, pilot tests, even when they did not collect adequate information or apply strict standards of rigor, were considered by all actors (and especially Nigerien ones) to be essential to demonstrating policies' feasibility in the Nigerien context.

Despite their sub-optimal scientific value, pilot projects proved useful in other ways. Donors sometimes funded pilot projects as a tool to convince national stakeholders to adopt policies and programs prioritized by their organizations:

> "Because people say 'yes, in India it happened, yes in Ethiopia it happened, in Rwanda it happened, that is OK; but in our country, how can we avoid things getting out of control?' That is why … we preferred a pattern with which it will be said that 'this is being implemented by people living in Niger, when you try it, it works'." (*NIG-2012-6-16, senior manager, international agency*)

> "[Ideas for pilot projects come] from the higher level, either from Unicef which is our major partner or from any other partner who is willing to invest in one area, in child health, in newborn health … They get in touch with us or with our leaders, and then things land here … Decisions are not made here, but

> we are the actors." (*NIG-2012-7-11-2, IMCI officer, government sector*)

At the same time, government actors used pilots to shape policies that would subsequently receive donor support. The 2006-07 iCCM pilot, for example, tested the policy using two cadres of health workers: CHWs and community volunteers (*relais communautaires*). International policy actors (notably at Unicef) favored using *relais* for iCCM, following the Senegalese example; however, they were stymied by the lack of regulatory status for the *relais* within the MOH hierarchy (and lack of any movement within the Ministry to create one). Thus, in early 2007 iCCM was scaled up using CHWs, a cadre that was well-integrated into the health system, in a marriage of policy and context that would ultimately prove key to iCCM's success (Dalglish et al., 2015). This decision, based on health systems knowledge and common-sense reasoning, was a clear case in which Nigerien government officials exercised power by using regulatory levers to overcome the policy wishes of actors at international technical agencies.

4. Discussion

Beginning in the early 2000s, policy actors in Niger drew on diverse types of knowledge and evidence to develop and implement iCCM, a strategy that would help bring about significant reductions in the number of child deaths in Niger. Evaluations of iCCM have generally shown good quality of care (Bensaid and Gali, 2009; Seidou, 2008) and estimations using the Lives Saved Tool (LiST) found iCCM and surrounding policies to have caused nearly a quarter of Niger's 43% reduction in child mortality between 1998 and 2009 (Amouzou et al., 2012). An Aristotelian conception of knowledge highlights how actors used complementary types of knowledge to achieve this policy success (Table 2). First, codified knowledge (*episteme*) was already inherently synthesized in the iCCM guidelines developed at the global level; research findings were further interpreted by bilateral and multi-lateral agencies and communicated "pre-digested" to Nigerien government actors, who had little direct access to the scientific literature. The technical skills (*techne*) needed to make policy were also unevenly distributed, with Nigerien government actors possessing negotiation and deliberative skills but lacking the capacity, resources and possibly desire to evaluate or document programs and policies; no transfer of these types of skills from international agencies was specifically noted. The practical wisdom (*phronesis*) of both Nigerien and international actors was essential to iCCM's success, notably ethical appeals about the need for task-shifting (there aren't enough pediatricians; children are dying now) and the practical benefits of linking iCCM with an already-institutionalized cadre of health workers.

An Aristotelian view of knowledge permitted a broader-than-usual look at the types of evidence used in policy-making, however the three constructs were not strictly separable and indeed often overlapped, leading us to analyze the Nigerien case using three "couplets" of the constructs. For example, Nigerien actors' attention to practical operational details and ability to draw lessons from countries with similar epidemiological and health systems contexts could be interpreted either as technical skills relevant to policy-making (*techne*) or as practical wisdom, as indeed *phronesis* is sometimes defined as the ability to apply general rules to particular situations, of clear relevance to the translation of globally-produced health policies to local contexts (Montgomery, 2006). Furthermore, some knowledge seemingly falling under *phronesis*, such as policy-makers' first-hand knowledge of the Nigerien health system, including significant early experiences using CHWs to provide basic primary health care, could easily fit under the *episteme* if it were written down, leading us to wonder how it would then influence policy debates. Our application of the Aristotelian framework in couplets was an attempt to capture these links and provide a more dynamic analysis of the ways in which power, knowledge and practice led to real-world outcomes.

The disparate access to codified knowledge between Nigerien government actors and partners at international agencies emerges as a main finding from this study, resulting in a dynamic by which government actors reflexively accepted partners' interpretations of this type of knowledge. Personnel at WHO and Unicef had vastly superior access to the scientific literature, allowing them to dominate interpretations of codified forms of knowledge, with summaries and translations shared from global headquarters down the line to regional and country offices and on to ministries, a one-way flow of information observed elsewhere in related country case studies of iCCM policy-making (Rodríguez et al., 2015a). Nigerien actors' seemingly passive acceptance of these interpretations was no doubt rooted in their lack of access to source documents, in addition to time constraints and competing priorities. International agency staff enjoyed recognized authority in these matters, as indeed WHO's technical advice is often highly regarded among government policy-makers in sub-Saharan Africa (Cruz and Walt, 2013). However not all available codified knowledge was utilized, notably including social science research, despite a significant body of relevant, high-quality studies, frequently in French. This research does not appear to have impacted policy making processes despite its usefulness for understanding historical policy precedents, current health system challenges, and care-seeking behaviors, though studies' length was a likely obstacle to their use by policy-makers.

A related finding is that large stores of informal knowledge were influential in determining the final shape of iCCM policy, for example regarding operational specifics of the Nigerien health system (e.g. the resources available and needed at community level) and the practical impossibility of reaching the majority of sick children with existing policies. This mainly unwritten knowledge influenced the policy process during oral policy debates at national workshops, whose formats placed a high priority on question-and-answer sessions and back-and-forth discussions between policy actors, demonstrating the value Nigerien actors placed on eliciting and integrating such knowledge into the policy process. Indeed the prime importance of oral discussion to communicate all types of knowledge emerges strongly from this case study. On the other hand, partners appeared to view these workshops as being politically necessary (to gain buy-in to policy decisions) but possibly superfluous from a technical standpoint. This raises the question as to whether the unwritten nature of such knowledge was a barrier to its use or acceptance by outside actors, who may have placed less value on tacit or experiential knowledge compared to more formal knowledge.

In the social sciences, the role of knowledge as both a source of power and a cudgel with which to yield it (particularly in technocratic settings) has been well established, beginning with thinkers in the Frankfurt School in the early 20th century, then later within Science and Technology Studies and perhaps most eloquently by Foucault (Foucault, 2002; Haas, 1992). A critical view of the iCCM policy-making process in Niger brings us to highlight power dynamics related to the use of knowledge during policy development. One source of power was in medical training and clinical knowledge, as when pediatricians, who made up a large portion of Nigerien policy actors, initially blocked treatment of pneumonia with antibiotics by CHWs. Indeed medical professionals have traditionally has exercised significant power in health policy due to their special knowledge and authority, legally granted occupational monopoly and cultural authority (Clark, 2014). In Australia, for example,

Table 2
Aristotelian view of knowledge and iCCM policy development in Niger.

Episteme-Techne	Techne-Phronesis	Phronesis-Episteme
• Global-level iCCM policy based on an high-level review of epidemiological and clinical studies • French-language summaries of important studies shared from technical assistance bodies to national policy-makers • Regional and international scientific meetings and conferences bring government actors up to date • Little practice in how to conduct valid and rigorous operational research and adequately document programming in Nigerien government offices • Little evidence of the transfer of research-related skills from actors at technical assistance agencies to government actors • High-quality socio-anthropological research on health systems and policy in Niger was available but not evoked by policy actors	• Study visit to Senegal allows for learning from a successful program in a similar context • Government actors negotiate policy and funding issues with donors/technical assistance organizations, use statutory levers to convince donors to accept their choice of implementing cadre for iCCM • Reflexive attention to operational details by government officials preceding and during implementation • Clinicians' experience with pediatric illness creates skepticism about lower-level health workers' ability to accurately diagnose pneumonia and safely prescribe antibiotics • Oral debate & exchange during policy-making elicit experiential knowledge and build consensus	• *Lancet* newborn and child survival series used as symbolic justification of the need to act • Epidemiological and demographic data and statistics on Niger (national statistics, DHS) confirm problem of “children dying at home” • Learnings from countries with similar epidemiological and cultural contexts strongly informed policy development • First-hand knowledge of the Nigerien health system not codified and used in policy discussions in informal ways • Moral and ethical arguments urge policy action to save dying children, even given imperfect scientific knowledge • Detailed operational knowledge of lower-level field workers not called upon in policy forums

despite long-standing efforts to enhance the weight of non-medical forms of knowledge (e.g. by including social science research and health systems and policy research), a network analysis found that medical professionals maintained a pervasive influence on policy over time (Lewis, 2006). Interestingly, in the Nigerien case study, the objections of this powerful class were overcome by logical, practical and ethical appeals of the need to reach sick children in rural areas with antibiotics, rather than with more rarified forms of knowledge. In contrast to this technical issue, traditionally powerful policy-making actors maintained control over operational decisions, for example by not meaningfully taking into account the input of CHWs at workshops and other policy forums.

Findings from this case study point toward two main recommendations. First, there is a clear need to improve in-country policy-makers’ access to codified knowledge to reduce power imbalances in the policy process and ensure existing knowledge is put to use. Open access publishing and platforms such as ResearchGate may be part of the solution; however policy-makers generally do not have time to mine the scientific literature and are thus beholden to interpretations provided by international technical assistance agencies, giving these latter significant technical power to drive the policy enterprise. Furthermore language barriers appear poised to remain an obstacle for non-English speakers. Knowledge translation platforms could play a role in this respect, especially if they were perceived as having objective legitimacy by being supported by multiple organizations. For example, a regional platform could serve the needs of Francophone West African countries (who see each as other as relevant reference points for research evidence), while also providing opportunities to link policy-makers and researchers in defining and pursuing research questions. International organizations should also make greater efforts to engage policy-makers in defining research questions, since results tend to influence the policy process only if stakeholders' needs are taken into consideration during research design, implementation and dissemination (Sauerborn et al., 1999). To this point, the WHO Alliance for HPSR's first request for proposals for decision-maker-led research in 2015 resulted in an overwhelming response, suggested pent-up desire for evidence designed specifically to inform policy.

Second, in research on policy-making processes, it is imperative to give more weight to forms of knowledge outside the *episteme*, as policy-makers themselves already do, and to judge evidence on how useful it is, regardless of its provenance. Critics have interrogated the underlying assumptions of the “evidence-based policy” paradigm as including reductive notions of types of evidence and the rationalist ways these are “translated” into policy (Behague et al., 2009; Greenhalgh and Wieringa, 2011; Morgan-Trimmer, 2014). Our findings support the notion that the evidence-based policy framework can mask power relations by focusing on the “insufficient” impact research has in shaping policy, reaffirming power dynamics at play between global and national-level actors, whereas senior national policy-makers draw on many types of knowledge – some of which is arguably much more critical to creating effective policies than scientific studies. This perspective brings us to further interrogate how “knowledge” is defined and by whom, the identities of the producers and disseminators of accepted forms of knowledge, and the structures that reproduce norms defining how knowledge should be used. Broadening our view of knowledge and evidence is especially critical for public health interventions which are more complex, contested and likely to be multi-sectoral than clinical interventions. Studies in implementation research and delivery science have been more open to exploring the “how” of implementation as well as documenting adaptations and real-world solutions; the science of public health must follow.

This study has some limitations. Some targeted stakeholders, particularly high officials, were unable to be interviewed; a few key documents were unavailable due a 2007 fire that destroyed servers at WHO offices in Niger. As in any qualitative study, respondents may have sought to portray events strategically, which we sought to mitigate by triangulating between respondents and among other data sources. Processing tracing methodology based on qualitative research also has limitations in assessing probabilistic relationships and missing variables, which could have affected our analysis. Finally the application of Greenhalgh and Wieringa's framework is new in the literature; therefore our application should be viewed as a preliminary attempt that will require feedback and future discussion among scholars. The strengths of this study include its in-depth case study methods, especially direct observation, an underused method in policy analysis that provided opportunities to observe policy actors negotiating and using knowledge in real-life settings, as well as its focus on a low-resource policy environment of the type that is rarely been studied in the literature.

5. Conclusions

Processes of research utilization and knowledge translation have primarily been studied from the standpoint of Western countries despite the fact that greatest burden of disease is found in LMICs. Furthermore, analyses of evidence-based policy making continue to rely on theoretical frameworks limited by narrow conceptions of the types of knowledge and evidence used in policy processes. This case study demonstrates the utility of addressing these two deficiencies in the literature in tandem, including new cases to expand theoretical categories. The importance of a critical perspective to examine sources of power such as access to codified knowledge, professional authority, and technical skill, among others, emerges as a central concern. Both researchers and policymakers in LMICs should consciously account for the diverse and multiple types of knowledge available for developing health policy and take a more active approach to applying these to addressing vital health problems.

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