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8 **Rapid Qualitative Research Methods during Complex Health Emergencies:**  
9 **A Systematic Review of the Literature**

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17  
18 **ABSTRACT**  
19

20 The 2013-2016 Ebola outbreak in West Africa highlighted both the successes and limitations of social  
21 science contributions to emergency response operations. An important limitation was the rapid and  
22 effective communication of study findings. A systematic review was carried out to explore how rapid  
23 qualitative methods have been used during global health emergencies to understand which methods are  
24 commonly used, how they are applied, and the difficulties faced by social science researchers in the  
25 field. We also assess their value and benefit for health emergencies. The review findings are used to  
26 propose recommendations for qualitative research in this context. Peer-reviewed articles and grey  
27 literature were identified through six online databases. An initial search was carried out in July 2016 and  
28 updated in February 2017. The PRISMA checklist was used to guide the reporting of methods and  
29 findings. The articles were assessed for quality using the MMAT and AACODS checklist. From an initial  
30 search yielding 1444 articles, 22 articles met the criteria for inclusion. Thirteen of the articles were  
31 qualitative studies and nine used a mixed-methods design. The purpose of the rapid studies included:  
32 the identification of causes of the outbreak, and assessment of infrastructure, control strategies, health  
33 needs and health facility use. The studies varied in duration (from 4 days to 1 month). The main  
34 limitations identified by the authors were: the low quality of the collected data, small sample sizes, and

35 little time for cross-checking facts with other data sources to reduce bias. Rapid qualitative methods  
36 were seen as beneficial in highlighting context-specific issues that need to be addressed locally,  
37 population-level behaviors influencing health service use, and organizational challenges in response  
38 planning and implementation. Recommendations for carrying out rapid qualitative research in this  
39 context included the early designation of community leaders as a point of contact, early and continuous  
40 sharing of findings, and development of recommendations with local policy makers and practitioners.

#### 41 **Keywords**

42  
43 Rapid qualitative methods, complex health emergency, systematic review, rapid appraisal, epidemic,  
44 natural disaster, qualitative health research

#### 45 46 **1. INTRODUCTION**

47  
48 In December 2013, a toddler from the Kissi region of Guéckédou Prefecture died of a sudden and  
49 mysterious illness – months later confirmed as Ebola – in a village near Guinea’s border with Sierra  
50 Leone and Liberia (Baize et al. 2014; Saéz et al. 2014). In the weeks, months and years to follow, the  
51 virus would spread throughout the West African region and beyond with over 28,000 people infected  
52 and over 11,000 deaths – a case rate nearly 70 times more than that of the next largest Ebola outbreak  
53 in history (WHO 2016). One of the most confounding aspects of the outbreak was the staggering  
54 inaccuracies of early disease models which were unable to predict how the basic reproduction number  
55 of Ebola would react in a regional environment with: 1) governments severely weakened by decades of  
56 corruption and civil war, 2) failing health care systems, 3) distrust between local populations and  
57 governmental figures, 4) extensive trading networks and patterns of mobility through porous national  
58 borders, 5) spread of the outbreak from rural locations to large, densely populated urban centers, and 6)  
59 burial rituals involving intimate contact with the deceased (a period in which viral loads are at their  
60 highest peak) (Abramowitz 2015; Aylward et al. 2014; Benton and Dionne 2015; CDC 2014; Chowell and

61 Nishiura 2015; Faye et al. 2015; Leach 2015; Richards et al. 2014; Wilkinson and Leach 2015). These  
62 were all contributors to the unprecedented spread of Ebola in West Africa in the 2013-2016 period, and  
63 all of these factors would later be extensively analyzed by social scientists with experience working in  
64 West Africa.

65

66 That social scientists have contributed to better understanding and responding to natural disasters and  
67 disease outbreaks, even past outbreaks of Ebola, is not a new phenomenon (Henry 2005; Hewlett et al.  
68 2005; Hoffman 2005; Koons 2010; Oliver-Smith 1979; Scheper-Hughes 2005; and Williams 2001 to name  
69 a few). What was new during the Ebola outbreak in West Africa, was the extent to which the  
70 contributions of social scientists were discussed and debated among global emergency response teams  
71 and their assistance actively, explicitly and openly recruited by international outbreak response  
72 organizations such as the WHO and UNICEF. For example, six months after health officials announced  
73 the Ebola outbreak, WHO made the unprecedented move to create the first-ever UN emergency health  
74 mission, UNMEER, with the core objective of scaling up the on-the-ground response to the outbreak.  
75 WHO explicitly recruited social anthropologists to work during the 'UNMEER phase' of the Ebola  
76 response and beyond UNICEF's Communication for Development (C4D) teams also made an effort to  
77 recruit anthropologists and other social scientists to work as embedded researchers in West Africa in  
78 support of the 'Social Mobilization' and/or 'Community Engagement' pillar of the response. Indeed,  
79 social scientists embedded in the response and those working remotely within their respective academic  
80 institutions were able to contribute key insights into the 'resistance' of communities following the  
81 unpopular dictates of public health response personnel, identify areas where public health goals and  
82 community sentiment aligned, highlight sensitive issues regarding the impact of Ebola on women's  
83 reproductive health and rights, and emphasize the unique cultural pathways for Ebola transmission

84 during funeral ceremonies (Abramowitz 2014; Allen et al. 2015; Anoko 2014; Epelboin 2015; Fairhead  
85 2014; Ferme 2014; Johnson and Vindrola-Padros 2014; Richards and Mokuwa 2014).

86  
87 What is equally true, however, is that public health officials had difficulty digesting the information  
88 provided by social scientists and often were unable to transform their qualitative data and expert  
89 observations into real-time recommendations for responding to a deadly, on-going outbreak. For  
90 example, WHO convened a multi-stakeholder review meeting in November 2015 of emergency risk  
91 communicators and community engagement personnel to outline how anthropologists and other social  
92 scientists working during the outbreak, could have improved their performance. Challenges  
93 encountered by social scientists working during the outbreak also increased due to the late stage of the  
94 response in which their expertise was sought and the lack of acceptance of social science knowledge by  
95 some policymakers and health workers. As stated by Martineau, coordinator of the Ebola Anthropology  
96 Response Platform (a network that connected social scientists and outbreak control teams), social  
97 scientists may have belatedly found themselves a seat 'at the table' but were often unable to achieve  
98 their aims (Martineau 2015).

99  
100 Social scientists themselves have alluded to the "quick and dirty" (Brennan and Rimba 2005:342; Menzel  
101 and Schroven 2016: para 22) methods often utilized because "in times of crisis...everything needs to  
102 happen fast" (Menzel and Schroven 2016: para 22). However, statements such as these both conflate  
103 'quick' with 'dirty' and negate a formal evaluation of rapid methodologies which can, with discussion  
104 and critical reflection, be improved upon to contribute valuable information to those responding to  
105 health emergencies. Much of the debate on the use of rapid methods vs. long-term research has  
106 centered on issues such as building rapport with local communities, capturing the insider's perspective,  
107 understanding the complexity of situations, documenting how beliefs and practices change through

108 time, and corroborating data and interpretations (Bernard 2011; Chambers 2008; Pink and Morgan  
109 2013; Wolcott 2005). Traditionally in the social sciences, a notion has prevailed regarding the  
110 relationship between the length of fieldwork and the accuracy, quality, and trustworthiness of the data,  
111 where rapid research designs are not valued or assessed in the same way as studies that require the  
112 long-term involvement of the researcher in the field. However, recent work has highlighted that in-  
113 depth qualitative research can be produced through short-term intensive fieldwork (Beebe 2014; Pink  
114 and Morgan 2013). Furthermore, rapid qualitative research promotes community engagement and can  
115 inform decision-making with regards to pressing social issues in a way that might not be possible in  
116 longer research projects (McNall and Foster-Fishman 2007; Trotter and Singer 2005).

117

118 In recognition of this, the authors – both of whom are anthropologists who were involved in working  
119 with Ebola response agencies during the outbreak – wanted to better understand the extent to which  
120 social science research, and qualitative methods more specifically, have been applied to past outbreaks  
121 and other complex health emergencies. The primary goal in conducting this systematic review of the  
122 literature was to explore the ways in which rapid qualitative methods have been used during on-going,  
123 global health emergencies of the last 15 years in order to better understand which methods are  
124 commonly used, how they are applied, the benefits and limitations of using these methods, and the  
125 difficulties faced by researchers in the field. Additionally, this review explores how the researchers  
126 themselves describe their use of rapid qualitative methodologies, the trustworthiness of the data, and  
127 use of research findings to inform the rapid decision-making processes required in responding to  
128 emergencies. The ultimate goal of this review was to learn from previous applications of rapid  
129 qualitative methods during complex health emergencies and propose recommendations for future  
130 research.

131

132

133 **2. METHODS**

134

135 **2.1 Design**

136

137 This is a systematic review of the literature. The Preferred Reporting Items for Systematic Reviews and  
138 Meta-Analysis (PRISMA) statement was used to guide the reporting of the methods and findings (Moher  
139 et al. 2009). The review was registered with PROSPERO (reference number: CRD42016049797).

140

141 **2.2 Research questions**

142

143 The research questions guiding the review were:

144 1. What are the most common methods of qualitative data collection and analysis during complex  
145 health emergencies?

146 2. What are the study timeframes?

147 3. Who are the most common data collectors engaged in this type of research (i.e. sociologists,  
148 anthropologists, psychologists, etc.)? What are their affiliations (i.e. academic, I/NGO,  
149 governmental, etc.)?

150 4. How are qualitative methods adapted to respond to rapid timeframes and emergency/disaster  
151 phases (i.e. planning, mitigation, response, recovery, evaluation)?

152 5. What are the main contributions of rapid methods?

153 6. How (if at all) was data translated/used/actionable during the response?

154 7. What are the challenges/limitations to conducting rapid qualitative research during health  
155 emergencies?

156 8. Are there any lessons learned from applying rapid methods in health contexts that can be  
157 relevant for other emergency contexts?

158

159 **2.3 Search strategy**

160

161 We used the Population-Intervention-Comparison-Outcomes-Setting (PICOS) framework (Robinson et al.  
162 2011) to develop our search strategy (Table 1). A search of published literature was subsequently  
163 conducted using multiple databases: MEDLINE, CINAHL Plus, Web of Science, Proquest Central. We also  
164 searched for grey literature in DISASTERS and ReliefWeb. We used keywords to describe different rapid  
165 research designs (i.e. “rapid appraisal”, “rapid evaluation”, “rapid ethnographic assessment”) and  
166 emergency contexts (i.e. “outbreak”, “epidemic disease”, “emergencies”). The full search strategy can  
167 be found in Appendix 1 (see ‘Supplementary Data’). The searches were conducted in July 2016 and  
168 updated in February 2017. Results were combined into RefWorks, and duplicates were removed. The  
169 reference lists of included articles were screened to identify additional relevant publications.

170 – INSERT TABLE 1 HERE –

171

172

#### 173 **2.4 Selection and inclusion criteria**

174

175 Both authors screened the articles in three phases (title, abstract, and full-text) based on the following  
176 inclusion criteria: 1) the study was developed in response to a complex health emergency, 2) the study  
177 used a rapid research approach, 3) the study used qualitative research methods, and 4) the purpose of  
178 the study was to inform the response to the emergency. Any disagreements over the inclusion of an  
179 article in the review were discussed until consensus was reached. We did not apply any restrictions in  
180 terms of language or date of publication and, in the case of articles that focused on rapid health needs  
181 assessments, we only included those that described a new or emerging health concern, or potential  
182 outbreak.

183

184 Definitions of complex emergencies and disasters abound and the contributions of social scientists to  
185 these fields of study, broadly speaking, have been well-documented (Button 1995; Henry 2005; Hoffman  
186 2005; Koons 2010; Oliver-Smith 1996). Our use of the term ‘complex health emergency’ does not seek to

187 supplant or redefine accepted definitions of complex emergencies and/or disasters, we use this term  
188 merely to illustrate that for the focus of this review we were interested in analyzing the work of  
189 qualitative researchers working explicitly on health-related issues during emergency events. The  
190 working definition we use for a complex health emergency can therefore be defined as a conflict,  
191 natural disaster and/or displacement of human populations event that causes, exposes or poses future  
192 health risks to vulnerable or marginalized persons which surpasses the ability of affected communities  
193 to recover using their own resources (Kulatunga 2010; Lowicki-Zucca et al. 2008; Oliver-Smith 1996;  
194 WHO 2002). We have not included cases of chemical hazards in our definition of complex health  
195 emergency as this type of hazard requires particular response strategies and has specific effects on  
196 health related to toxicity or long-term genetic complications that might not be present in other complex  
197 health emergencies and might fall outside of the scope of rapid qualitative research (Clements and  
198 Casani 2016).

199  
200 We define rapid qualitative research as an approach that uses qualitative methods, or uses qualitative  
201 methods in combination with other methodologies, to provide an understanding of the impact of  
202 complex health emergencies by collecting and analyzing data within a short period of time (Beebe 2014;  
203 Morin et al. 2008; McNall and Foster-Fishman 2007). As Beebe (2014) has argued, it is difficult to  
204 establish the ‘correct’ length of time for a rapid study, as this will depend on the particular characteristic  
205 of the study (i.e. purpose, location, context, etc.). In the case of this review, we included articles that  
206 self-identified as rapid research (see search strategy in Appendix 1), but excluded those where the  
207 process of data collection resembled the length of time of non-rapid research (for instance, studies that  
208 exceeded data collection periods of 6 months). We defined qualitative research in relation to the  
209 “methodological stances associated with qualitative research” proposed by Snape and Spencer (2003:4).

210  
211 **2.5 Data extraction and management**

212  
213 The included articles were analyzed using a data extraction form developed in RedCap (Harris et al.  
214 2009). The categories used in the data extraction form are summarized in Appendix 2 (see  
215 ‘Supplementary Data’). The form was developed after the initial screening of full-text articles, and was  
216 then piloted independently by the authors using a random sample of five articles. The form was changed  
217 based on the findings from the pilot, mainly to refine the categories and add new data points. Cross-  
218 checking of the RedCap online extraction forms was carried out for all articles included in the review.  
219 Discrepancies were discussed until consensus was reached. Cases of missing data were dealt with by  
220 contacting the authors and also by online searches aimed at collecting background information on the  
221 authors.

## 222 223 **2.6 Data synthesis**

224  
225 Data were exported from RedCap and the main article characteristics were synthesized. The RedCap  
226 report created a quantitative summary of some of the data. The data inputted in free text boxes were  
227 exported and analyzed using framework analysis (Spencer et al. 2013). The framework method  
228 organizes data in a matrix where rows contain the cases (the reviewed articles in the case of our  
229 review), the columns are the codes, and the cells contain the raw data (Gale et al. 2013; Spencer et al.  
230 2013). This approach facilitates the synthesis of data and exploration of patterns by case and code (Gale  
231 et al. 2013). The codes were grouped into the following themes: benefits, limitations, difficulties, and  
232 recommendations.

## 233 234 **2.7 Risk of bias**

235  
236 The assessment of the risk of bias is an important component of systematic reviews (Higgins et al. 2011),  
237 We used the Mixed Methods Appraisal Tool (MMAT) to assess the quality of the articles published in  
238 peer-reviewed articles (Pluye et al. 2012; Pluye and Hong 2014). We used the AACODS checklist to  
239 assess the quality of the grey literature (Chang and Tyndall 2014). All of the articles included in the

240 review were assessed with the exception of Krumpkamp et al. (2010), as this was not an empirical study.  
241 The two authors rated these articles independently. The raters discussed their responses and inter-rater  
242 reliability was calculated using the kappa statistic (Landis and Koch 1977). The results from the  
243 assessments can be found in Appendix 3 (see 'Supplementary Data').

244  
245

### 246 **3. RESULTS**

247

#### 248 ***3.1 Identification of articles***

249

250 The initial search yielded 1444 published articles (Figure 1). These were screened based on title and  
251 type of article, resulting in 195. Screening based on abstracts left 51 articles for full-text review. This  
252 phase in screening led to 20 articles that met the inclusion criteria. We excluded articles that focused on  
253 chemical hazards or emergencies produced by armed conflict as well as those where rapid methods  
254 were not used for research purposes (i.e. they were mainly used for diagnostic purposes). Two  
255 additional articles were identified by reviewing the bibliography, ultimately leading to 22 articles  
256 included in the review.

257

258 – INSERT FIGURE 1 HERE –

259

260

#### 261 ***3.2 Characteristics of included articles***

262

263 The characteristics of the 22 articles included in the review are presented in Table 2. The articles were  
264 published between 2003 and 2016, but we noticed a significant boost in publications from 2014-2016  
265 with 13 articles published between this timeframe (i.e. over half of the full-text articles reviewed). All 13  
266 articles dealt with the Ebola outbreak in West Africa during this time period, indicating a trend towards  
267 the use of rapid qualitative assessments for assisting community-based response efforts.

268

269 The locations of the studies included a wide range of geographical contexts such as: Afghanistan,  
270 Indonesia, Thailand, Pakistan, Uganda, U.S., the Amazon, Liberia, Sierra Leone and Guinea. These last  
271 three countries were the locations of more than half of the articles included in the review, all of which  
272 centered upon the Ebola outbreak. Almost half of the studies took place in the community, while the  
273 rest were carried out in healthcare facilities, government offices, shelters or relief centers. Twelve  
274 articles were published in peer-reviewed journals, while ten were reports included in the CDC's  
275 Morbidity and Mortality Weekly Report (MMWR).

276  
277 – INSERT TABLE 2 HERE –  
278

### 279 280 **3.3 Complex health emergencies and purpose of the research** 281

282 When considering the type of complex health emergency, we were able to divide the articles in two  
283 main categories: natural disasters with potential health consequences, and epidemic outbreaks (see  
284 Table 3). In the case of the articles on the health consequences of natural disasters, rapid research was  
285 used to: 1) assess the public health impact of the disaster (mainly on water and sanitation) (Atuyambe et  
286 al. 2011; Brennan and Rimba 2005), 2) document existing infrastructure in order to plan humanitarian  
287 assistance (Bile et al. 2010; Brahmhatt et al. 2010; Güereña-Burgueño et al. 2006), or 3) evaluate the  
288 effectiveness of response strategies (Broz et al. 2009).

289  
290 In the case of rapid research for epidemic outbreaks (i.e. *not* natural disasters), there were additional  
291 study aims as outlined in the articles reviewed. We were able to group the articles in four main  
292 categories based on the purpose of the research: 1) identification of causes of the outbreak and  
293 transmission cases, 2) assessment of existing infrastructure and resources, 3) evaluation of control  
294 strategies, and 4) analysis of health needs and health facility use during the epidemic. This last category

295 was frequent in studies on the Ebola response as they sought to address cases of mistrust towards the  
296 healthcare system.

297  
298 – IINSERT TABLE 3 HERE –

299  
300 All of the articles indicated that the studies were carried out with the purpose of informing ongoing  
301 strategies by local government offices or non-governmental organizations. Examples of the translation  
302 of findings included: the identification of high-risk areas (Cheung et al. 2003), development of a  
303 framework for pandemic planning (Krumpkamp et al. 2010), establishment of new surveillance and  
304 case-finding mechanisms (Brahmbhatt et al. 2010; Hagan et al. 2015), prioritization of existing  
305 healthcare resources (Pathmanathan et al. 2014), and adjustment of existing interventions (Lee-Kwan et  
306 al. 2014)

### 307 308 **3.4 Research design**

309  
310 Thirteen of the articles were qualitative studies and nine used a mixed-methods design. Most of the  
311 qualitative studies combined interviews with observations (Broz et al. 2009; Forrester et al. 2014a,  
312 2014b; Nielsen et al. 2015; Pathmanathan et al. 2014; Summers et al. 2014), with occasional studies  
313 adding focus groups (Carrion Martin et al. 2016; Dynes et al. 2015; Lee-Kwan et al. 2014), documentary  
314 analysis (Abramowitz et al. 2015; Krumkamp et al. 2010) or community mapping (Hagan et al. 2015). In  
315 the case of the mixed-methods studies, these either combined interviews with structured surveys (Bile  
316 et al. 2010; Brahmbhatt et al. 2010; Flores et al. 2011), or interviews and observations with secondary  
317 data analysis (Brennan and Rimba 2005; Güereña-Burgueño et al. 2006; Kilmarx et al. 2014; Matanock et  
318 al. 2014). Some mixed-methods studies also included focus groups (Atuyambe et al. 2011) and case note  
319 reviews (Cheung et al. 2003). The combination of multiple methods and the triangulation of data were  
320 seen as effective ways of ensuring the required data were collected within limited timeframes.

321

322 The length of the research varied and, in some articles, it was difficult to determine the exact length of  
323 data collection. The shortest study was four days (Brennan and Rimba 2005) and the longest was one  
324 month (Yamanis et al. 2016), but about half of the studies were carried out within two weeks. Eleven  
325 articles described studies where data were collected from healthcare staff or government officials, six  
326 studies collected data from community members, four collected data from healthcare staff and  
327 community members, and one article did not specify the study participant population. Sample size was  
328 not reported in nine of the studies.

### 329 **3.5 Author background**

330 Since one of the explicit criteria of our search strategy was to focus upon research where the purpose of  
331 using rapid qualitative methods was to collect information for informing public health response efforts,  
332 it is important to highlight characteristics of the authors which we see as a direct result of this strategy.  
333 These characteristics can be grouped into three categories: 1) the number of authors (per article), 2) the  
334 interdisciplinary nature of co-authors (per article), and 3) the mixture of emergency response  
335 organizations and research institutions paired with governmental entities (per article).

338  
339 The average number of co-authors per article we reviewed was seven, with a minimum of two authors  
340 (Brennan and Rimba 2005) and maximum of 13 (Matanock et al. 2014). While no discernible pattern  
341 emerged with regards to the professional background of authors (e.g. epidemiology or anthropology),  
342 the departmental affiliations of multiple co-authors clearly illustrate the interdisciplinary nature of rapid  
343 research. In 16 of the articles co-authors included a mixture of emergency response organizations and  
344 research institutions (e.g. CDC, WHO, UNICEF), paired with governmental health departments (e.g.  
345 Department of Health-Pakistan, Ministry of Health and Sanitation-Sierra Leone). With one exception  
346 (Yamanis et al. 2016), all articles featured co-authors with affiliations across multiple departments,  
347 agencies and/or institutions.

348

349 We also explored the types of research teams undergoing fieldwork and found that, in most cases, these  
350 tended to be international research teams. Most of the studies mentioned maintaining links with non-  
351 governmental organizations and national government offices such as Ministries of Health. Only two of  
352 the articles included in the review reported the recruitment and training of local researchers and the use  
353 of their knowledge of the local culture and languages during data collection and analysis (Abramowitz et  
354 al. 2015; Atuyambe et al. 2011).

355

### 356 ***3.6 Contributions and limitations of rapid qualitative research***

357

358 Very few of the articles included in the review critically examined the contributions and limitations of  
359 rapid qualitative research in the context of complex health emergencies. The three main contributions  
360 of rapid qualitative research outlined by the authors were: 1) the rapid identification of context specific  
361 issues that need to be addressed locally (Abramowitz et al. 2015), 2) rapid needs assessment that can  
362 act as a guide for resource allocation (Brahmbhatt et al. 2010; Pathmanathan et al. 2014), and 3)  
363 provision of data to plan long-term assistance (Güereña-Burgueño et al. 2006). A limitation of rapid  
364 qualitative health research can be the low quality of the collected data, as time constraints might have  
365 limited access to key informants or other data sources, thus producing gaps during the data collection  
366 process (Pathmanathan et al. 2014). The authors also highlight that rapid research designs tend to use  
367 small sample sizes, which complicates the generalizability of findings (Brennan and Rimba 2005). Finally,  
368 rapid qualitative research might be subjected to bias, in the form of recall, reporting or misclassification  
369 bias, with little time for cross-checking facts with other data sources (Brennan and Rimba 2005).

370

371 After considering these limitations, some of the authors in the reviewed articles proposed a series of  
372 general recommendations for carrying out rapid qualitative research in these settings. Cheung et al.  
373 (2003) argue that a factor that can guarantee the success of the research under strict timeframes is the

374 early designation of community leaders who can act as a point of contact for research teams. This early  
375 work with community leaders needs to be done in parallel to the establishment of a network of  
376 community, regional, and national agencies where collaborative agreements are created to facilitate the  
377 research, but also ensure the continuous dissemination of study findings (Cheung et al. 2003). Findings  
378 need to be shared with relevant stakeholders from the time data collection begins. These findings also  
379 need to be disseminated in a format that can be used to inform decision-making (Brennan and Rimba  
380 2005) and recommendations need to be developed in conjunction with local policy makers to ensure  
381 applicability and acceptance (Krumpkamp et al. 2010).

## 382 383 **4. DISCUSSION**

### 384 385 ***4.1 What can we learn from the characteristics of the included studies?***

386  
387 Even though our inclusion criteria were specific, we expected to find more articles that used rapid  
388 qualitative methods in complex health emergencies. Our search strategy might have certainly missed  
389 some eligible articles, but we feel one of the findings of this review is the lack of dissemination of studies  
390 using this type of research design.

391  
392 We noticed a significant increase in studies using rapid qualitative methods during the last Ebola  
393 epidemic. This could in part be due to changes in the approaches used to conduct epidemic  
394 investigations in the past decade. In a commentary on the evolution of epidemic investigations and field  
395 epidemiology at the CDC, Brachman and Thacker (2011) highlighted an increase in the number of social  
396 scientists involved in research teams.

397  
398 Another important aspect to consider was the fact that grey literature, mainly in the form of reports,  
399 seemed to be an important form of output in complex health emergency research, and should therefore  
400 be considered in future literature reviews on this topic. As Adams et al. (2016) have argued, grey

401 literature can be used to increase knowledge in areas where scholarship is underdeveloped, draw  
402 attention to new topics of inquiry or corroborate existing academic findings.

403  
404 **4.2 What's missing in the research designs?**

405 In general, the methodological descriptions in the articles reviewed were not extensive and, in some  
406 cases, key data related to sample size and participant populations were not identified, affecting the  
407 quality assessment scores of the articles (see Appendix 3). This finding is consistent with other studies of  
408 published data collection activities during complex health emergencies. A recently published systematic  
409 review on the effect of health interventions in humanitarian crises concluded that there is not enough  
410 quality research conducted across health topics of importance to the humanitarian crisis of the last four  
411 decades (Blanchet and Roberts 2015). As stated by Blanchet in a recently delivered course on *Health in*  
412 *Humanitarian Crisis*, "The humanitarian sector is suffering from the lack of routine data. Not enough  
413 data, or not the right data, is systematically, routinely collected" (Blanchet 2017:2). We would add to  
414 this that in cases where the right data might be collected, the reporting of the data and data collection  
415 methods are not transparently reported, making it difficult to assess the quality of the research and  
416 trustworthiness of the data.  
417

418  
419 In addition to the lack of information on sample size and populations in the articles included in this  
420 review, the timeframes for data collection were 'not specified' in multiple articles (see Table 2) making it  
421 difficult to surmise how authors understand 'rapid' data collection (e.g. two days or two months), or if  
422 this is even how they would describe their work. There is an unfortunate impression among social  
423 science disciplines with historically long-term periods of fieldworks that 'quick' or 'rapid' data collection  
424 is not rigorous or reliable (Beebe 2014; McNall and Foster-Fishman 2007). If this impression is to be  
425 corrected, and if social science methods are to innovate to help "reduce suffering, improve survival, and  
426 ensure better preparedness for future outbreaks" (Henry and Shepler 2015:21) then we must be more

427 rigorous in publishing our methodologies, more precise in our terminology, and more willing to own the  
428 label of 'rapid' (*not* dirty) research. Doing so will enable social science researchers, and the public health  
429 managers who rely upon their data, to be more confident in their conclusions, more definite in their  
430 recommendations to emergency response agencies, and more candid in how rapid qualitative methods  
431 can (and cannot) provide needed data. This will also enable important distinctions to be made between  
432 the rapid methods used during initial and acute phases of an emergency, and how they can be adapted  
433 and improved upon for more longer-term, longitudinal and traditional forms of monitoring and  
434 evaluation which should occur throughout an emergency response.

435  
436 **4.3 Why is author background important?**  
437

438 We can conclude from the background of authors included in this review that rapid qualitative research  
439 with the purpose of informing the response to a complex health emergency, requires the collaboration  
440 of multiple interdisciplinary researchers with research institutes, UN and I/NGO agencies and  
441 governmental health systems. As stated by (Calhoun and Marrett 2008:xxi), "a disproportionate  
442 number of major scientific discoveries and innovations involve crossing the boundaries of established  
443 disciplines." This highlights the need for social scientists to critically examine how they write and where  
444 they publish the results of their work so as not only to reinforce disciplinary boundaries, but also to  
445 innovate at the boundaries by building bridges for collaboration, data sharing and knowledge transfer.

446  
447 **4.4 Why utilize rapid qualitative methods?**  
448

449 It is no surprise that the articles culled for full-text review here originate from some of the most  
450 recognized public health crises of the 21<sup>st</sup> century – from the Indian ocean tsunami in 2005 to the Ebola  
451 outbreak in West Africa in 2014. As these articles reveal, the health emergencies public health  
452 responders have grappled with within the last decade alone challenge the preparedness and response  
453 capabilities of international response agencies, national governments and local organizations. When

454 complex health emergencies occur, multiple forms of interdisciplinary expert knowledge are needed to  
455 contribute to the rapid mobilization of response agencies, their personnel, and inter/national  
456 governments. As stated by Lurie et al. (2013:1251), the challenges that public health responders have  
457 faced since the turn of the century have “underscored a persistent need to be better prepared to  
458 resolve important research questions in the context of a public health emergency...additional research,  
459 done in parallel with and after the response itself, is often essential to address the most pressing  
460 knowledge gaps presented by public health emergencies.” Despite this, the importance of utilizing rapid  
461 qualitative methods during the complex health emergencies discussed in the articles culled for this  
462 review did not extensively (or at all) reflect upon how research designs using rapid methods were able  
463 to provide necessary data that other methods could not achieve. To this end, we draw from the articles  
464 included in this review, and additional research, to identify several areas in which the use of rapid  
465 qualitative data collection and analysis methods, conducted by trained social scientists, can be most  
466 useful for quickly responding to complex health emergencies. Critical reflection upon the types of data  
467 that rapid qualitative methods in particular can obtain, paired with how findings from rapid research  
468 designs may be applied in an emergency, is crucial for advancing social science specialization within this  
469 arena.

470

#### 471 4.4.1 Responsive to local contexts for drawing on community resilience mechanisms

472 In the wake of complex health emergencies, community resilience can be defined as “linking a network  
473 of adaptive capacities” such as information and communication, and community competence in order to  
474 “reduce risk and resource inequalities, engage local people in mitigation, create organizational linkages,  
475 [and] boost and support social supports” (Norris et al. 2007:127). Social scientists recognize that  
476 communities are not without their own resilience mechanisms which can be mobilized to mitigate public  
477 health emergencies, yet previous studies highlight that local knowledge is rarely valued and used

478 (McKay and DeCarbonel 2016: 64). Social scientists, for example, using qualitative methods during  
479 health emergencies, have demonstrated success in developing community-based surveillance tools that  
480 are responsive to the capabilities of local communities and which, ultimately, aim to strengthen  
481 resilience through participatory community-based approaches (Abramson et al. 2015; Henry 2005;  
482 Whiteford and Vindrola-Padros 2015). For instance, Whiteford and Vindrola-Padros (2015) have argued  
483 that some community-based models such as the Community Participatory Involvement (CPI) model can  
484 help build capacity within communities for controlling and preventing epidemics because they focus on  
485 developing and supporting local leadership and ensuring equal participation across sub-groups (i.e.  
486 women, young people, etc.). Development of contextually-relevant research tools and mechanisms for  
487 community engagement which consider the assets and capacities of affected communities is needed at  
488 all phases of an emergency in order to be reflective of pre-emergency community contexts, responsive  
489 to the altered environment created during an emergency response, and capable of considering how  
490 systems set-up during an emergency will affect communities once the health crisis has resolved and/or  
491 public health response agencies are no longer involved (Koons 2010; McKay and DeCarbonel 2016).

492

#### 493 4.4.2 Responsive to rumors and associated population-level behaviours

494 Rumors and misconceptions thrive during periods of social duress, particularly in the absence of clear  
495 communication guidelines and trusted channels for delivering health messages (Briggs 2011; Hewlett  
496 and Hewlett 2008; Schoch-Spana 2000). This is something health managers need to grapple with in  
497 dealing with both infectious disease threats, as well as routine public health challenges (e.g. vaccination  
498 campaigns). Using secondary data analysis (e.g. systematic literature reviews) and qualitative data  
499 collection techniques (e.g. interviews with key medical personnel), researchers can help to contextualize  
500 rumors by explaining local rationale behind and identifying how beliefs may influence the behaviors of  
501 affected populations. Longitudinal data collection among populations affected by complex health

502 emergencies also serves as an important reminder to emergency responders to not assume they know  
503 what is in the minds affected populations, nor think perceptions will remain static throughout an  
504 emergency operation. Qualitative methods can also help emergency public health responders quickly  
505 identify the sources that affected population trust and listen to the most (for delivering key public health  
506 messages), and for assessing whether or not these persons have accurate and up-to-date information  
507 (Briggs and Mantini-Briggs 2003).

508

#### 509 4.4.3 Able to reveal societal tensions which disproportionately affect marginalized populations

510 The complexity of how diseases interact with human populations when introduced into unique  
511 environmental, biological, and sociocultural settings is something which specialized subfields, such as  
512 medical anthropology, are well-versed in researching (Hoffman 2015). Further, social science disciplines  
513 have an extensive history of critically engaging socio-cultural realities which marginalize, exclude or  
514 make vulnerable certain populations. As many veteran emergency managers can attest, societal  
515 tensions – particularly those which have been politically repressed or ignored – reveal themselves most  
516 during times of crisis amidst the fears and uncertainties which disasters inspire (Blaikie et al. 1994). As  
517 an example, anthropologists have commented extensively on how Hurricane Katrina, one of the  
518 deadliest hurricanes in US history, revealed deep-rooted currents of racial and economic discrimination  
519 against those most affected by the disaster (Hoffman 2005; Scheper-Hughes 2005). Insights such as  
520 these are vital to emergency health planners for identifying and responding to the unique needs of at-  
521 risk groups – before, during and after an emergency. These are concepts which should immediately  
522 factor into how emergency response operations are designed, executed and, ultimately, how they are  
523 dismantled after the crisis is over.

524

#### 525 4.4.4 Useful to study organizational challenges of response efforts to highlight gaps and omissions

526 At a 2014 panel entitled 'Ebola in Focus' of the American Anthropological Association (AAA) annual  
527 meeting, panelists from WHO, UNICEF and MSF concluded that "We need a humanitarian anthropology  
528 that is embedded in that response, yet is able to be critical of it" (Henry and Shepler 2015:21). Complex  
529 emergency events place new stresses on donors, organizations and individuals who may not be familiar  
530 with responding to a health crisis, but are nonetheless tasked with its execution (Mahapatra 2014;  
531 Oliver-Smith 1979). For unanticipated emergency events, local response organizations must quickly shift  
532 their priorities, personnel and budgets all of which can create confusion in the flow of information,  
533 chains of command and worker roles and responsibilities (Mahapatra 2014). As the articles included in  
534 this review have demonstrated, qualitative research methodologies that "capture human behavior at its  
535 most open, realistic moments" during an emergency need not be limited solely to work at the  
536 community-level (Mahapatra 2014:241). These same methodologies are also useful for studying  
537 organizational challenges and "bureaucratic rigidities" encountered during complex response operations  
538 (Mahapatra 2014:241). Capturing the experiences, needs and lessons learned from the work of  
539 emergency response personnel which might otherwise go undocumented in the rush to bring aid, can  
540 help to illuminate these 'rigidities'. As noted by Henry (2005), the top-down approach taken by most  
541 specialized, international disaster relief organizations may lead to the failure of on-going operations and,  
542 ultimately, impact the sustainability of recovery programming.

543

#### 544 ***4.5 Limitations of the review***

545 This review has a series of limitations and the findings should be interpreted with these in mind. The  
546 literature search was initially carried out in July 2016 and updated in February 2017, therefore any  
547 articles published after this date have not been included in this review. Although we used multiple  
548 broad search terms and developed our search strategy using the PICOS framework, it is possible that we  
549 missed peer-reviewed articles and grey literature that did not use these terms. Our decision to include

550 grey literature in the review was based on the fact that much of the research carried out in this field is  
551 not normally published in peer-reviewed journals. We were able to capture a significant number of  
552 reports in our grey literature searches, but we might have missed studies where the researchers were  
553 not able to share findings beyond the organizations where they worked (i.e. due to proprietary data  
554 issues). Upon this point, it is important to note the structural barriers involved in researching complex  
555 health emergencies which may have prevented social science researchers from publishing the results of  
556 their rapid studies in either grey literature or academic sources. Rapid qualitative research for  
557 responding to complex emergencies is often conducted on behalf of organizations who use data for  
558 informing their own individual response efforts. For researchers who have been contracted to work for  
559 these organizations, the data they collect most often belongs to the organization, not themselves. As  
560 such, publication of 'internal' data may not be a priority or even a desire of organizations who do not  
561 want the results made available to a larger audience. This is particularly true where data reveals  
562 organizationally or political sensitive information. Further, academic publication sources often require  
563 proof that a formal IRB process has been systematically followed by those engaged in research with  
564 human populations. For professional social scientists responding quickly to a crisis, it may not be feasible  
565 (or ethical) to halt their work while waiting on formal approval from an official review body. In addition,  
566 regions or countries which have experienced long-term crisis (e.g. civil war), or those who have been  
567 crippled by a sudden and unexpected health emergency (e.g. Ebola), may not have a functioning review  
568 system in place.

569

570 We defined qualitative research based on the definition proposed by Snape and Spencer (2003). This  
571 definition was selected because we felt it captured various dimensions of qualitative research  
572 (perspectives, design, data generation, research methods, analysis, and outputs). However, use of this  
573 definition might have resulted in our missing studies that defined qualitative research differently. Our

574 decision to narrow the scope of the review to epidemics and exclude armed conflicts and chemical  
575 hazards also limits the findings of the review. We believe that future reviews could be carried out on the  
576 use of rapid qualitative research in the context of armed conflicts and chemical hazards. An overview of  
577 these reviews in the form of an umbrella review (Baker et al. 2014; Smith et al. 2011) could then  
578 compare how rapid qualitative methods are used across these contexts and identify similarities and  
579 differences in their application.

580

581

## 582 **5. CONCLUDING THOUGHTS**

583

584 Within the last 15 years, the CDC has remarked on the need for increased collaboration with social  
585 scientists, specifically anthropologists, during complex emergencies. Williams (2001) has stated that  
586 while anthropological input may be, theoretically speaking, valued among public health professionals, in  
587 reality “applied anthropologists rarely have been teamed with public health practitioners in the arena of  
588 complex emergencies” (Williams 2001:4). Recent public health international emergencies (PHIE) such as  
589 Ebola have prominently featured the strengths (and sometimes weaknesses) of social scientists  
590 responding to disease outbreaks, which could spur the systemic changes necessary for interdisciplinary  
591 collaboration in the future. Given the unprecedented nature of the Ebola outbreak in West Africa, both  
592 in terms of scale and duration, it remains to be seen whether or not the trend towards a boost in social  
593 science publications (as evidenced from 2014-2016) will continue in the future with regards to the use of  
594 rapid qualitative studies during health emergencies in non-Ebola settings. However, the increased use  
595 of social scientists during the Ebola outbreak has been sustained in subsequent outbreaks (e.g. the Zika  
596 outbreak of 2015-16), and the trend towards bringing social science knowledge and capacity to better  
597 understanding and addressing acute phase complex health emergencies has taken root at the highest  
598 policy-level (e.g. WHO Social Science Interventions Team).

599

600 There is a tendency in the social sciences, and the discipline of anthropology in particular, to equate in-  
601 depth research with long-term fieldwork. However, several authors have argued that long-term  
602 fieldwork is not suitable for all research topics and contexts and the quality of the research should not  
603 be assessed based on the amount of time researchers spend in the field (Beebe 2014; Pink and Morgan  
604 2013). As noted by Abramowitz et al. (2015), traditionally deployed anthropological methods involving  
605 significant time spent in the field prior to reporting on a situation, could potentially limit the  
606 contributions of these qualitative methods to emergency response efforts.

607  
608 What is evident from our review is that social scientists have been engaging in rapidly conducted  
609 research during complex health emergencies for some time, but there was a notable increase in this  
610 type of research design using explicit 'rapid' methods during the Ebola epidemic. All of the studies in the  
611 reviewed articles were developed to inform responses to disasters and epidemics and were carried out  
612 by interdisciplinary and multi-organizational teams. The pressures created by rapid research design led  
613 several researchers to develop community-based networks to facilitate quick immersion in the field and  
614 targeted collection of data. These networks were also used to disseminate findings and inform decision-  
615 making.

616  
617 Social science researchers need to be present at the beginning of an emergency health response to set  
618 in place systems for data collection which are relevant, sustainable and draw from a diverse array of  
619 methodologies depending on contextual realities on the ground. Social science research was not sought  
620 during the Ebola outbreak until several months after the outbreak was discovered and after multiple  
621 failed attempts at communication with communities who were frightened of Ebola responders and were  
622 not observing infection control measures. In order to have an early seat 'at the table' and be relevant at  
623 the outset of an emergency, social science researchers will need to find new and innovative ways for

624 adapting methods for rapid data collection to address the most pressing needs during the early phases  
625 of an intervention, and they will need to be good communicators with public health managers as to how  
626 their data can and should be applied to mitigate the effects of the emergency and increase the  
627 effectiveness of the response.

628  
629 A significant amount of work remains to further develop the use of rapid qualitative research  
630 approaches in the emergency context. In order to move forward, it is essential for social scientists to  
631 critically reflect on the benefits as well as drawbacks of these methods in order to incorporate lessons  
632 learned into future emergency response operations. As stated above, critical reflection upon the types  
633 of data that rapid qualitative methods in particular can obtain during complex health emergencies is  
634 crucial for advancing social science specialization within this arena. We have included in this article  
635 several areas of inquiry in which social science knowledge and methods have been most beneficial  
636 during periods of crisis, however, this listing is not exhaustive and only hints at the benefits to be gained  
637 by engaging trained social scientists during emergencies. We therefore invite scholars to continue the  
638 trend established by the Ebola outbreak in publishing the results of rapid qualitative research.

639 Publication of such work needs to 1) rigorously define and describe the methodologies used, and 2)  
640 explicitly state how these methodologies were able to collect data necessary for informing public health  
641 response efforts. This can be achieved through both traditional academic and grey literature sources (as  
642 utilized for this review), and via informational platforms established with the express purpose of  
643 disseminating data through interdisciplinary collaboration (e.g. Ebola Anthropology Response Platform,  
644 Society for Medical Anthropology's Zika Pop-up Interest Group). Platforms such as these provide  
645 important examples of the benefits to be gained from collaboration among a concerned group of  
646 scholars and require, at a minimum, recognition among all interested parties (e.g. response agencies,  
647 research institutions, practitioners) of the need to disseminate data in 'real time.'

648

649 As stated in the limitations section of this review, due to the multiple structural barriers which prevent  
650 publication of social science data during complex emergencies, it is likely that our search strategy did  
651 not return research results which would help to further the work of social scientists within this field. We  
652 therefore hope this review will aid social science efforts to open up spaces where scientists can  
653 remediate the barriers which prevent us from learning from each other within the critically important  
654 arena of complex health emergencies.

655

656

657 **6. SUPPLEMENTARY DATA**

658

659 – INSERT LINK TO ONLINE FILES: APPENDIX 1, APPENDIX 2, & APPENDIX 3 –

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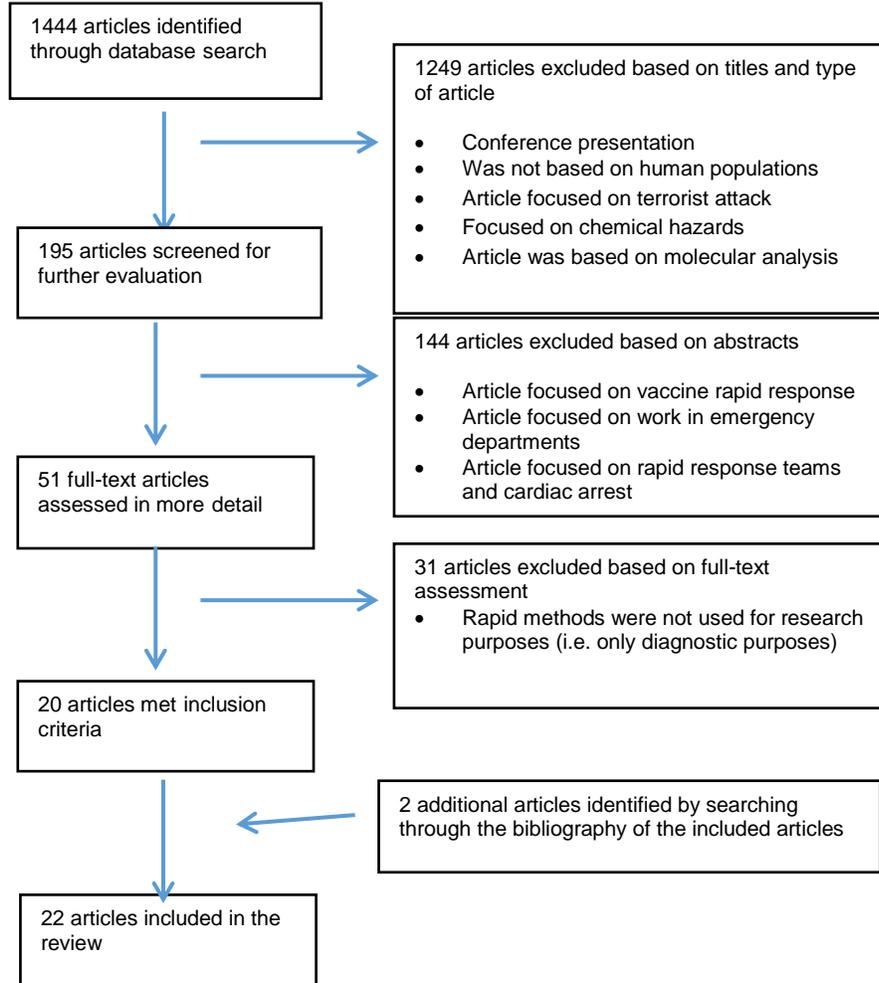
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985 **Figure 1 – Study selection procedure.**  
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990 **Table 1 – PICOS framework used to develop search strategy.**  
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<b>PICOS Element</b>	<b>Definition</b>
<b>Population</b>	Complex health emergency
<b>Intervention</b>	Rapid assessment, evaluation, or study using qualitative methods or combining qualitative methods with other methods (mixed-methods)
<b>Comparison</b>	No intervention (i.e. non bio-medical or clinical-based study)
<b>Outcomes</b>	The purpose of the rapid assessment/evaluation/study is to collect information that is used to inform the response to the complex health emergency
<b>Setting</b>	Rapid study, assessment or evaluation that took place in a non-clinical setting (e.g. community-based setting)

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**Table 2 – Main characteristics of articles included in the review.**

First author name	Year	Location and type of setting	Type of complex health emergency	Study aims	Timeframe for data collection	Research design	Research methods  Type of research team	Sample size and population	Use of research findings
Cheung, E. et al.	2003	Afghanistan  Setting: Rural community	Outbreak  Scurvy	Identification of scurvy outbreaks and monitoring of an intervention	A few days (exact number not specified)	Mixed methods	Focus groups; Case note reviews  International and national “monitoring” teams	120 community members in 15 focus groups (groups with men and women, inclusion of village leaders)	Identification of high-risk areas for targeting interventions
Brennan and Rimba	2005	Indonesia  Setting: Rural community	Natural disaster  Tsunami	Determine the public health impact of a tsunami	4 days	Mixed methods	Observations; Focus groups; Surveys; Secondary data analysis  International and national research teams	Survey among 32 households  Focus group with women from the community sample size not specified	Informed the International Rescue Committee’s response
Güereña-Burgueño, F. et al.	2006	Thailand  Setting: Healthcare facilities	Natural disaster  Tsunami	Rapid health needs assessment to plan and execute humanitarian assistance	7 days	Mixed methods	Interviews; Observations; Secondary data analysis  International and national research teams	Administrative and clinical staff from 12 hospitals	Informed US humanitarian assistance strategies

Broz, D. et al.	2009	USA  Setting: Relief center	Natural disaster  Hurricane	Effectiveness of response strategy to provide health care to Hurricane Katrina evacuees	11 days	Qualitative	Interviews; Observations  National research team	33 staff members (clinicians and non-clinical support staff)	Informed the response directed by the Chicago Department of Public Health
Krumkamp, R., et al.	2010	N/A	Outbreak  Influenza	Systematic assessment of the national health system capacity to respond to pandemic influenza	Not specified	Qualitative	Interviews; Documentary analysis	Not specified	Developed a new framework for pandemic planning
Bile, K. M. et al.	2010	Pakistan  Setting: Government offices and healthcare facilities	Natural disaster  Earthquake , cyclone and floods	Effective coordination, joint planning, distribution of roles and responsibilities, and resource mobilization between partners	A few days (exact number not specified)	Mixed methods	Survey; Informal interviews (described as 'consultations')  International and national research teams	Government, humanitarian agencies, and other partners  Sample sizes not specified	Informed the response to enhance primary care and hospital capacities
Brahmbhatt , D. et al.	2010	USA  Setting: Shelter	Natural disaster  Hurricane	Evaluate the composition, pre-deployment training and recognition of scenarios with	8 days	Mixed methods	Interviews; Surveys  National research team	43 shelter staff members (including volunteers, nurses, medical technicians, and assistants)	Informed the response by providing a disease burden assessment and establishing surveillance

				outbreak potential by shelter health staff					mechanisms
Atuyambe, L. et al.	2011	Uganda  Settings: Community, healthcare facilities	Natural disaster  Land slide	Assessment of water, sanitation and hygiene to inform interventions	5 days	Mixed methods	Interviews; Observations; Focus groups; Surveys  Led by national research team, but local research assistants (familiar with local culture and language) were recruited and trained	28-44 camp residents in focus groups;  27 health care providers, humanitarian agency workers, district health officials, and local leaders in interviews;  397 camp residents in survey	Informed interventions directed by the Ministry of Health and the Ministry of Relief, Disaster Preparedness and Refugees
Flores, W. et al.	2011	Amazon sub-region  Setting: Government offices and departments	Outbreak  Malaria	Rapid assessment of the performance of four malaria control strategies	Not specified	Mixed methods	Interviews; Surveys  National and international research teams	120 government authorities and PAHO advisors	Informed regional malaria control strategies
Forrester, J. et al. *	2014a	Liberia  Setting: Healthcare facilities	Outbreak  Ebola	Assessment of Ebola case burden, health care infrastructure, and	9 days	Qualitative	Interviews; Observations  National and international research teams	HCWs (health officials, hospital administrators, clinicians, and health	Informed the Ebola response strategy organized by the Liberian Ministry of Health and

				emergency preparedness				educators) Sample size not specified	Social Welfare
Forrester, J., et al. *	2014b	Liberia Setting: Healthcare facilities	Outbreak Ebola	Rapid evaluation to identify cases of Ebola transmission among HCWs and possible sources of exposure	5 days	Qualitative	Interviews; Observations International research team (CDC)	Infected HCWs, staff members and volunteers at ETU Sample size not specified	Informed the Ebola response strategy organized by the Liberian Ministry of Health and Social Welfare
Matanock, A. et al. *	2014	Liberia Setting: Healthcare facilities	Outbreak Ebola	Assessment of Ebola virus disease cases among health care workers not working in Ebola treatment units	Not specified	Mixed methods	Interviews; Secondary data analysis; Observations National and international research teams	County health officials and contact tracers Sample size not specified	Informed the Ebola response strategy organized by the Liberian Ministry of Health and Social Welfare
Pathmanathan, I. et al. *	2014	Sierra Leone Setting: Healthcare facilities	Outbreak Ebola	Identify existing resources and high priority outbreak response needs	5 days	Qualitative	Interviews; Observations International research team (CDC)	Administrative and clinical staff in 12 health facilities (including the medical officer and senior clinicians)	Allowed the Sierra Leone Ministry of Health and Sanitation to prioritize prevention and control resources
Summers, A., et al. *	2014	Liberia	Outbreak	Identify county-	15 days	Qualitative	Interviews; Observations	Healthcare workers	Informed the Ebola response

		Setting: Healthcare facilities	Ebola	specific challenges in executing Ebola response plans, and to provide recommendations and training to enhance control efforts			International research team (CDC)	Sample size not specified	plans directed by the Liberian Ministry of Health and Social Welfare
Lee-Kwan, S., et al. *	2014	Sierra Leone  Setting: Community and counselling sessions	Outbreak  Ebola	Assessment of Ebola virus disease survivor needs	30 days	Qualitative	Interviews; Observations; Focus groups  National and international research team involving multiple organizations	87 survivors in focus groups  12 survivors in interviews  Observations during 6 wellness sessions	Informed improvements in survivor services directed by Emergency Operations Center staff and partners
Kilmarx, P., et al. *	2014	Sierra Leone  Setting: Healthcare facilities	Outbreak  Ebola	Characterize risk of Ebola virus disease infection for HCWs and guide prevention efforts	Not specified	Mixed methods	Interviews; Observations; Secondary data analysis  International research team (led by CDC)	HCWs and health facility administrators  Sample size not specified	Guided prevention efforts and controlled infection by HCWs
Abramowitz, S., et al.	2015	Liberia	Outbreak  Ebola	Provide baseline information on	20 days	Qualitative	Focus groups; Observations; Documentary analysis	368 community leaders took part in 15 focus groups	Informed program design and evaluation directed by the

		Setting: Community		community-based epidemic control priorities and identify local strategies for containing the epidemic			Local research teams led and trained by external lead (applied medical anthropologist)		WHO and the Government of Liberia
Dynes, M., et al. *	2015	Sierra Leone  Setting: Community and healthcare facilities	Outbreak  Ebola	Assess attitudes and perceptions regarding the risk for Ebola and health facility use to increase use of maternal and newborn health services	30 days	Qualitative	Focus groups  National and international research teams	34 HCWs and 27 pregnant and lactating women	Informed response strategy directed by the Sierra Leone Ministry of Health and Sanitation
Nielsen, C., et al.*	2015	Sierra Leone  Setting: Community	Outbreak  Ebola	Assessment of burial practices, cemetery management, and adherence to practices recommended to reduce the risk for Ebola virus	5 days	Qualitative	Interviews; Observations  National and international research teams	15 community members and 12 burial team supervisors	Informed response strategy directed by the Sierra Leone Ministry of Health and Sanitation

				transmission					
Hagan, J., et al. *	2015	Liberia  Setting: Community	Outbreak  Ebola	Assess area needs and guide response efforts	5 days	Qualitative	Case finding; Area mapping; Interviews  Research team composed of CDC team members and county health team	Village leaders and community representatives  Sample size not specified	Led to the creation of a process of active case finding
Carrion Martin, A., et al.	2016	Guinea  Setting: Community	Outbreak  Ebola	Identify sociocultural determinants related to community resistance	Not specified	Qualitative	Observations; Interviews; Focus groups  International research team	5 key informants (interviews)  10 healthcare workers and survivors (focus groups)	Informed the strategies implemented by local WHO teams
Yamanis, T., et al.	2016	Sierra Leone  Setting: Community	Outbreak  Ebola	Explore the barriers preventing lack of trust and use of the Ebola response system during the outbreak	2 months	Qualitative	Interviews  International research team	30 community members	Informed local response efforts

PAHO: Pan American Health Organization

HCWs: Health Care Workers

ETU: Ebola Treatment Unit

\* Grey literature

**Table 3 – Aims of rapid research.**

<b>Identification of causes of the outbreak and transmission cases</b>	<b>Assessment of existing infrastructure and resources</b>	<b>Evaluation of control strategies and other interventions</b>	<b>Analysis of usage of health facility/services and health needs</b>
<b>Identification of causes of the outbreak (Cheung et al. 2003)</b>	Assessment of capacity to respond to the outbreak (Krumkamp et al. 2010)	Assessment of control strategies (Broz et al. 2009; Flores et al. 2011)	Analysis of the barriers behind lack of health facility use (Carrion Martin et al. 2016; Dynes et al. 2015; Yamanis et al. 2016)
<b>Identification of cases of transmission (Abramovitz et al. 2015; Forrester et al. 2014b; Kilmarx et al. 2014; Matanock et al. 2014; Nielsen et al. 2015)</b>	Assessment of infrastructure (including water and sanitation facilities) and disease burden (Atuyambe et al. 2011; Bile et al. 2010; Brahmbhatt et al. 2010; Brennan and Rimba 2005; Forrester et al. 2014a; Güereña-Burgueño et al. 2006;)	Enhancement of control efforts (Summers et al. 2014)	Identification of survivor needs (Lee-Kwan et al. 2014)
--	Assessment of existing resources (Hagan et al. 2015; Pathmanathan et al. 2014)	--	--