An Analysis of Hepatitis C Virus–Related Public Inquiries from Health Professionals: 2009–2010

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A content analysis was performed on e-mail inquiries about viral hepatitis that were submitted by health professionals to the Centers for Disease Control and Prevention’s (CDC’s) public inquiry system, CDC-INFO. All hepatitis C virus (HCV)–related inquiries from health professionals were identified, representing 10% of all inquiries received during the 2-year period of 2009–2010. Three-fourths of the inquiries included professional degree and organizational affiliation information, with 35% representing physicians, 33% representing nurses, and 6% representing midlevel clinicians, the majority of whom provided direct clinical care or worked in a healthcare organization. Two independent coders analyzed content, with κ coefficients for inter-rater agreement ranging from 0.82 to 0.93. Overall, the inquiries demonstrated important knowledge gaps regarding HCV, with the most frequently asked questions focusing on transmission, serology, and policy/legal issues surrounding patient care and infected healthcare workers.
forwarded to the Division of Viral Hepatitis for review or, in the case of highly technical questions, for CDC response. The overall CDC-INFO system captures only minimal data on inquiries: date of inquiry and main disease category (eg, HIV infection, cancer, and hepatitis). No other information is available on either the content of the question or the professional role of the inquirer. To further characterize the nature of hepatitis-related inquiries, a special study was undertaken in 2008 and found that most of the CDC-INFO inquiries came from the public (Jorgensen et al, unpublished data). Approximately one-third of the total inquiries came from health professionals. While public inquiries focused equally on hepatitis B virus (HBV) and HCV; health professionals focused primarily on HBV, followed by hepatitis A virus (HAV); and only 4% of the total inquiries focused specifically on HCV. Given such little information on the questions related to HCV from health professionals, this additional study was undertaken to build on the 2008 study and specifically to analyze HCV-related information contained in inquiries from health professionals processed by CDC-INFO during a 2-year period.

**METHODS**

Content analysis is a research method that uses a set of categorization procedures to systematically and objectively identify specific characteristics within a text [4] and is commonly applied to textual content, including e-mail communications. A total of 657 e-mail inquiries from the 2-year period (1 January 2009 through 31 December 2010) were processed by CDC-INFO and sent to the Division of Viral Hepatitis. Each e-mail inquiry was coded by type of hepatitis virus (HAV, HBV, HCV, hepatitis D virus, and hepatitis E virus) and type of information seeker (professional, public, or other). The “other” category (n = 70 e-mails) represented inquiries about publication orders, speakers, exhibits, or Web site issues and was dropped from the analysis. All e-mail inquiries from health professionals that involved an HCV-related question were identified for analysis. For each e-mail inquiry, the main question posed was assigned to one of 9 categories: transmission, serology, prevention, diagnosis, treatment/healthcare, legal/policy, blood donation, general statistics, or other. Since serology-related questions were assumed to be a major area of inquiry, the coding form separately captured whether the inquiry asked about serology as the main presenting question. The inquirer’s professional title, degree, and organizational affiliation were recorded if stated or contained in e-mail signature blocks, message content, or e-mail addresses. This coding schema was based on the categories used in the 2008 analysis (Jorgensen et al, unpublished data) and was slightly modified for the current study. Two separate coders, who also serve as CDC-INFO e-mail reviewers, coded each inquiry independently.

The data were entered electronically into a database, which was later converted into a database for analysis, using SAS version 9.2 (SAS Institute). Interrater agreement was measured among the 3 coding categories reported in this study, using the Cohen $\kappa$ coefficient and yielded interrater agreement coefficients ranging from 0.82 to 0.93. Any discrepancies in coding were later resolved through a tiebreak involving a third coder and author. The final data sets were analyzed using frequencies and measures of central tendency.

**RESULTS**

Of the 587 inquiries analyzed for 2009–2010, 37% came from health professionals, and 63% came from the public. HCV represented 45% of the overall total inquiries, while HBV comprised 34% of the inquiries. Six percent of inquiries pertained to HAV, and 5% of inquiries involved >1 hepatitis virus (Table 1). Six percent of inquiries did not specify a hepatitis virus type and instead contained nonspecific content, such as requests for information on “incarceration and hepatitis” or “post exposure prophylaxis and hepatitis.”

HCV inquiries from the public composed the largest single category of interest (35%). This was followed by HBV inquiries from health professionals (19%), the percentage of which was only slightly greater than the percentage of public inquiries about HBV (15%). HAV was not a common topic of inquiry for either group. Healthcare professional inquiries about HCV only accounted for 10% of the total inquiries.

<table>
<thead>
<tr>
<th>E-mailer</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D, E</th>
<th>Nonspecific</th>
<th>&gt;1*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health professional</td>
<td>16 (3)</td>
<td>110 (19)</td>
<td>59 (10)</td>
<td>20 (3)</td>
<td>5 (1)</td>
<td>10 (2)</td>
<td>220 (37)</td>
</tr>
<tr>
<td>Public</td>
<td>21 (4)</td>
<td>89 (15)</td>
<td>203 (35)</td>
<td>2 (&lt;1)</td>
<td>32 (5)</td>
<td>20 (3)</td>
<td>367 (63)</td>
</tr>
<tr>
<td>Total</td>
<td>37 (6)</td>
<td>199 (34)</td>
<td>262 (45)</td>
<td>22 (4)</td>
<td>37 (6)</td>
<td>30 (5)</td>
<td>587 (100)</td>
</tr>
</tbody>
</table>

* Hepatitis D and E viruses are considered 1 type for the purpose of this metric.
(Table 1). Of the HCV-related inquiries from health professionals, most focused solely on HCV, while a small proportion asked about multiple hepatitis virus types (including HCV) and/or bloodborne pathogens. The latter were also included in this analysis, resulting in a total of 65 e-mail inquiries.

Three-fourths of the professional inquirers provided information about their degree, and of those, 35% were physicians, 33% were nurses, 6% were midlevel clinicians, and 27% were other health professionals, such as dentists, emergency medical technicians, individuals with a doctorate, and individuals with a masters degree in public health. The majority (65%) of health professionals provided their organizational affiliation or role; 88% of these indicated that they provided direct clinical care or worked in healthcare organizations, while 12% represented state or local public health departments or academic institutions.

Each e-mail was coded and assigned to one of 9 main content categories (see Table 2). Eighty-five percent of the inquiries fell into one of 4 main topic areas: serology, transmission, legal/policy, or other. A few inquiries asked about treatment, statistical information, blood donation, or diagnosis, while none of the inquiries asked about prevention. The most frequent main topic of inquiry involved serology, representing 29% of all the HCV-related questions from professionals. In addition, 45% of all questions included a serology-related question, even if the main presenting question involved another topic, such as transmission or treatment. Inquiries ranged from basic questions about testing to more sophisticated questions about the interpretation of serologic tests. An example follows:

“I am seeing a 15 month old, born to a woman with hepatitis C. Patient is in good health with unremarkable past medical history. Her parents request she was tested for anti-HCV at 12 months of age and found to be negative. Should I follow AAP Red Book guidelines and test again at 18 months, or will this negative test at 12 months of age suffice.”

The next most frequent main topic of HCV-related inquiries from health professionals focused on questions related to transmission, with 28% of the e-mails classified under this category. While some transmission-related questions were quite simple, over a quarter (28%) involved questions about occupational exposures. Examples are as follows:

“Can HCV be transmitted via exposure to sewage?” [inquiry from a board-certified gastroenterologist]

“A healthcare worker exposed to a source patient via needle stick or splash, has a history of hepatitis C currently undetectable. Is the source patient able to transmit disease with undetectable virus? And should the healthcare worker receive post exposure f/u testing for the full year at 6 weeks, 3 months, 6 months, and 1 year?” [inquiry from a nurse practitioner]

“I was curious about the seroconversion rate of hepatitis C with a mucosal splash. I found the rate/percentage for percutaneous exposure (1.8%) but not for mucosal. If you do have a response, can you send me a link with the information in writing?” [inquiry from a dental hygienist/assistant professor]

The remaining questions fell into several other categories, with inquiries categorized as “other” (15%) and “legal/policy” (11%) being the next 2 largest categories. As with other areas of inquiry, questions varied widely. Questions categorized as “other” represented a broad range of topics, including the hepatitis Web site, case reporting, and surveillance. Many of the legal/policy-related questions asked about screening and restrictions of healthcare workers. Two examples follow:

“Kindly update about the CDC guideline for pre-operative screening for Hepatitis C for all elective surgical procedures in a healthcare setting.” [inquiry from a physician]

“Has there in the past ever been a recommendation (rescinded now) that would require regular testing of Dialysis Staff for Hepatitis C?” [inquiry from a nurse]

### Table 2. Main Content of Hepatitis C Virus–Related E-mail Inquiries from Health Professionals, CDC-INFO, 2009–2010

<table>
<thead>
<tr>
<th>Main content of e-mail</th>
<th>Inquiries, No. (%) (n = 65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission</td>
<td>18 (28)</td>
</tr>
<tr>
<td>Serology</td>
<td>19 (29)</td>
</tr>
<tr>
<td>Prevention</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Treatment/healthcare</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Legal/policy/social</td>
<td>7 (11)</td>
</tr>
<tr>
<td>General statistics</td>
<td>5 (8)</td>
</tr>
<tr>
<td>Blood donation</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Other</td>
<td>10 (15)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In this study, the content of e-mail inquiries sent to the CDC-INFO system were analyzed, with a particular focus on HCV-related inquiries from health professionals. This analysis found that approximately 10% of the overall CDC-INFO e-mail inquiries during 2009–2010 were HCV-related inquiries that came from health professionals, an increase from 4% of HCV-related inquiries found in the 2008 analysis (Jorgensen et al, unpublished data). As in the 2008 analysis, most of the total inquiries came from the public. This analysis found that
the public’s interest in HCV also increased, from 19% of all inquiries in 2008 to 35% of all CDC-INFO e-mail inquiries.

Comparison of the 2 studies revealed that both contained inquiries representing basic questions. The current study, however, showed a different pattern regarding the main topics of inquiry. Questions about transmission, serology, and legal/policy issues were approximately double the percentages of those received from health professionals in 2008.

The ongoing finding that relatively few inquiries from health professionals were related to HCV, despite its complexity and large health burden, was unexpected. Whether the small, but increasing number of HCV related inquiries is a reflection of health professionals’ low awareness about HCV, a result of minimal testing of persons at risk, the lack of use of outside e-mail systems such as CDC-INFO, or something else is still unknown. Additional research is needed to help answer these questions and further understand knowledge levels and interest in HCV.

It is unclear whether the trend of low volumes of HCV-related inquiries will persist or whether, with the advent of new HCV therapies, the need for HCV information will increase. Since the study period was prior to the Food and Drug Administration’s approval of the new direct-acting therapies, it is possible that interest in HCV may result in increases in HCV-related inquiries from health professionals to the CDC-INFO system in the future. If the dramatic increase in the number of public inquiries between 2008 and the period evaluated in the current study is any indication, interest in HCV is growing. Regardless, on the basis of current topics of inquiries, the CDC may need to enhance its education, training, and technical resources for both health professionals and the public.

Since e-mail systems are a relatively new channel for public inquiry and health information delivery, research is limited on this mode of communication. Only a few studies examine interactive e-mail systems, and most of these studies focused on closed e-mail systems that allow patients to have confidential contact with their healthcare professionals [5, 6]. Only one identified article, which examined the National Cancer Institute’s Cancer Information System (CIS), briefly discussed e-mail as a communication channel [7]. While health professionals use the CIS, the article did not conduct a separate analysis of professional inquiries and only reported a similar rate of use of the system.

While this study revealed several findings of significance, there were also limitations. Given the large number of main topics, some individual topic sample sizes were small. Future content analyses may need to include an even longer period to obtain a sufficiently robust sample size. Since health professional status was inferred from e-mail signatures or through context, it is possible that some health professionals may have been misclassified because of nondisclosure of degrees or organizational information. Last, the sample represents health professionals who have selected to use the CDC-INFO system, and these individuals may not be representative of their respective professions. Despite the limitations, this research provided useful information for planning, and its findings are consistent with those of other qualitative studies underway at the Division of Viral Hepatitis. Armed with the results of these studies, the Division of Viral Hepatitis will use the information to improve its education and training efforts.

In summary, consistent with the findings of the 2010 Institute of Medicine report on viral hepatitis [1], the content analysis found that knowledge and awareness about HCV is lacking among some health professionals. Some topics can be easily addressed by adding content to the CDC’s viral hepatitis Web site and to educational materials, while other content areas, such as hepatitis-related serology, will require more substantial and targeted educational efforts.

Notes
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