

Interviewing practices in partner notification for STD and HIV

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## Introduction

Partner notification (PN), or contact tracing, has long been a cornerstone of efforts to control the spread of sexually transmitted diseases (STD) and HIV (1-3). The PN process involves persons diagnosed with disease informing sexual partners (and drug injection partners, in the case of HIV) about their exposure to infection and the need for medical examination and treatment. Often this process begins when a public health worker counsels a patient about PN and elicits his or her partners who may have been exposed to the infection. Typically, the patient and public health worker then make a plan about who – the patient and/or the public health worker – will notify particular partners and ensure their medical evaluation and treatment.

Interviewing cases to elicit their partners and information about partners is the heart of PN. The information obtained in such PN interviews, or contact interviews, drives the whole PN process. It has long been recognized that effective PN hinges on complete and accurate data on partners (4), among other factors. Interviewing practices, though, are only one component of the PN process controlled by public health officials. Other key elements in the purview of health departments include the availability of databases and other resources for tracing partners and the accessibility and appropriateness of medical facilities and treatment.

Perhaps the most critical aspect of contact interviewing is the elicitation of partners. However, disease control workers and researchers have long suspected that cases do not report their partners completely. Many potential reasons for incomplete reporting

have been suggested (5). One class of possible reasons relate to consequences of diagnosis and PN, including a confused emotional state from learning diagnosis (6), resentment towards partners for transmitting infection (7), reluctance to get partners into trouble (8), fear of reprisal/violence by partners (8, 9), and fear of rejection by partners (10). Another set of possible reasons for underreporting partners involves impression management, privacy, and motivational issues, including the social undesirability of admitting stigmatized behaviors (11-13), code among drug injectors not to name other drug users (6, 8), confidentiality concerns (6, 8, 12, 14, 15), desire to keep the interview short (16), and lack of rapport between interviewer and patient (17). A third class of possible factors concerns memory, including forgetting/memory errors (7, 8, 18), a large number of partners (14, 19, 20), recalling partners from long periods of time (12), perceived lack of sufficient locating information on partner (8), and anonymous/casual contact with partners (11, 14, 21-23).

Research shows that people do indeed underreport their partners when asked to recall them. Among the many possible reasons why people may not report partners, forgetting figures prominently. Many people with or at high risk for STD/HIV forget a substantial fraction of their recent sexual and injection partners when asked to recall them, as indicated by inconsistent reporting of particular partners in repeated interviews, self-reported forgetting, discrepancies between partners reported in interviews and those recorded in diaries, and unreciprocated reports between individuals in a partnership (5, 24-26). Individuals who report many partners are the most likely to forget partners (5). In addition, recalled and forgotten partners are generally similar on

key epidemiologic variables, such as frequency and recency of exposure (5). There is also some evidence that cases intentionally do not report some partners. In a small study of syphilis cases in Atlanta, Chicago, and Los Angeles, Richter and colleagues found that 8% acknowledged to a researcher that they did not mention 1 or 2 of their sexual partners to the disease control worker in a PN interview (27).

In this report, I review interviewing practices that relate to applied aspects of PN and make recommendations for disease control practice and research based on this review. The next section describes the methods I used in conducting the review. Subsequent sections present the results from the review and corresponding recommendations for seven areas of PN interviewing practice: interview context, interviewing modes, reinterviewing, interview periods, elicitation techniques, interviewer effects, and the reliability and validity of reported partner information. The final section offers some conclusions.

### Method

I collected reports written in English and German that pertained in some way to interviewing practices in PN. I identified potential reports to include from earlier reviews of this literature (see the companion report on case finding effectiveness of PN (28)), my own library of over 1,000 reports on PN and interviewing, and a search of MEDLINE (via PubMed on May 18, 2003) for relevant articles published in 2001-3 with four pairs of keyword combinations (contact tracing/partner notification x STD/HIV). I also obtained relevant articles cited in the reports that I inspected. My emphasis is on reports that

described empirical research on interviewing practices in PN rather than research on interviewing in non-PN settings or suggestions for practice that are not based on systematic data.

I also draw on my observations, made in-person and from audiotapes, of trained and experienced disease control staff interviewing STD cases in Colorado Springs (as part of National Institute of Health-funded research in 1999-2000) and Seattle (during my supervision of disease control staff in 2001-2).

#### Interview context

Two aspects of PN interview context have been studied—type of HIV testing site for HIV diagnosis and approach to partner referral. Between 1990 and 1992 in Colorado, HIV cases diagnosed at confidential testing sites named more sexual/needle-sharing partners ( $M = 1.09$ ) than those diagnosed at an anonymous testing site in Denver ( $M = 0.79$ ,  $p < .05$ ) (29). Similar differences between types of testing site existed for case finding yield as well.

Mathews and colleagues conducted a meta-analysis of randomized controlled trials comparing provider/contract referral (where the provider—typically a disease control worker—is responsible for notifying partners) with patient referral (where the case is responsible for notifying partners) (30). They found that cases interviewed in settings with patient referral tended to name slightly more partners on average than cases interviewed in settings with provider or contract referral. However, provider/contract

referral resulted in more partners examined than patient referral, effectively canceling out any advantage of patient referral in eliciting partners.

### Recommendations

- 1) Emphasize confidential testing for HIV to maximize partner elicitation and case finding yield.
  
- 2) Other modifications of the interview context might also improve PN outcomes. For instance, many PN interviews occur after cases have spent many hours in a clinic, and thus they are tired, frustrated, and eager to leave. In other situations, cases are reluctant or uncooperative interviewees. Trials of paying cases to participate in PN interviews might be conducted to test whether this obstacle can be mitigated.
  
- 3) It would be useful to know whether and how partner elicitation differs when performed for PN and non-PN purposes (e.g., research). These questions could be addressed with analyses of existing data that compare the amount and nature of information elicited about cases' sexual behavior, drug use, and partners (number elicited, locatability/anonymity, etc.) in PN interviews of STD/HIV cases and similar samples (including cases interviewed in non-PN contexts). Similarities on these outcomes would suggest that PN interviewing could be approached in much the same way as interviewing for research on sexual and injection networks. However, differences on these outcomes might indicate that PN interviews truly are unique and may require a special approach.

### Interviewing modes

Traditionally, PN interviews have been conducted face-to-face, in-person. This approach is very labor and time intensive and sometimes impractical. These disadvantages have spurred some STD control programs to experiment with alternative interviewing modes, including self-administered questionnaires (SAQ), telephone interviews, and audio computer-assisted self-interviewing (ACASI). A small amount of research has assessed these approaches for PN interviews.

Hollister described an interesting SAQ that providers gave to index cases and asked them to complete (31). The first part of the SAQ included a brief statement of the importance of PN and why it was essential to provide information about partners. Patients then recorded the identifying and locating information and dates of exposure for each partner whom they could within the specified time frame. The index case's own identity and that of his/her provider were not recorded anywhere on the form. After completing the form, cases were to fold, seal, and send the form as a self-addressed prepaid envelope to the state medical association, which then transferred the forms to the state board of health. A three-month pilot of the form in one area of Mississippi sometime in the early to mid-1940s showed that 50 percent of the providers in the area used the form. Forty-four gonorrhea and early syphilis cases reported 81 partners on the SAQ. Investigation of these partners identified 30 new cases of gonorrhea and early syphilis.

Telephone interviewing is perhaps the most common alternative to face-to-face PN interviews. In a randomized trial of supplementary elicitation techniques for PN in Colorado Springs in 2000-1 (32), gonorrhea and chlamydia cases interviewed face-to-face ( $n = 93$ ) reported marginally more partners ( $M = 1.98$ ) prior to administration of the supplementary elicitation techniques than those interviewed by telephone ( $n = 21$ ,  $M = 1.67$ ;  $p > .2$ ) (Brewer et al., unpublished data).

ACASI is the interviewing mode with the greatest potential to transform PN interviewing. In diverse populations, survey respondents report greater sexual and injection risks and socially undesirable behaviors when interviewed by ACASI than by human interviewers in a face-to-face context (33-35). Noell and colleagues have designed an ACASI program to increase an STD case's perceived severity of STDs, perceived susceptibility to STD, self-efficacy, and trust in the confidentiality of information given to the health department (36). The program involves elicitation of partners, and also is intended to improve recall of partners, facilitate reporting of partners to the health department, and enhance patient referral. In its present form, the ACASI program is administered to a case after diagnosis but prior to a face-to-face interview with a disease control worker. The program is currently being evaluated in a controlled trial (compared with an educational video) conducted in an STD clinic and a health maintenance organization in Oregon. The trial's primary outcomes are the number of partners elicited, number and proportion of partners notified by patient referral and provider referral, and number and proportion of partners examined.



## Recommendations

- 1) Analyze existing observational data and conduct randomized controlled trials on the effect of the different interviewing modes on PN process measures (number of partners elicited, examined, and newly diagnosed). Even if SAQ, telephone interviewing, and ACASI are less productive than face-to-face interviews, these alternate modes may still be very useful for increasing coverage of PN substantially at relatively little cost, especially for cases diagnosed by private providers and gonorrhea and chlamydia cases. Only a small minority of such cases receive formal PN services in the US (37).
  
- 2) Evaluate strategies to make face-to-face interviews more efficient and thorough. For example, CDC guidelines indicate that interview forms should never be completed in the presence of the case (38), as they are thought to detract from communication and harm rapport, and thus reduce the amount of information elicited. Research is needed to determine whether this claim has merit, particularly given the many decades of using forms during interviews for epidemiologic research. If a health department's data systems were sufficiently developed, a further clerical step could be eliminated by interviewers entering interview data directly into computers during the course of interviews (another practice with considerable precedent in epidemiologic research).
  
- 3) ACASI also has advantages over the other modes in that it would allow easy, rigorous, and standardized investigation of many questions about interviewing

practices in PN (described in subsequent sections of this report). ACASI also has the potential to be delivered via the Internet, which would make PN interviewing even more accessible to cases diagnosed by private providers.

### Reinterviewing

Reinterviewing, or interviewing a case multiple times to elicit partners, has long been used in STD control. Often reinterviews are performed, in part, because interviewers neglected to ask essential questions in the first, or “original”, interview. There is limited quantitative evidence of the effectiveness of reinterviewing. In one sample of 1,000 STD cases in Berlin, Germany, in 1976, a second interview, just before PN was completed for the case, elicited 9% additional partners (in the aggregate) over the first interview (39). A second sample of 110 gonorrhea cases diagnosed in the same Berlin clinic in 1976-77 was interviewed at examination, prior to diagnosis. The results showed that a second interview (after diagnosis) and third interview (just before closing the case for PN purposes) together elicited 12% additional partners (in the aggregate) over the first interview. These additional partners accounted for an 11% increase in the aggregate number of partners located and a 13% increase in the total number of infected partners (newly detected and previously detected). This indicates that partners elicited from reinterviews were as likely to be found and infected as partners elicited in the first interview. In addition, Stuart noted that in the late 1940s in the US, reinterviews for syphilis PN resulted on average in one additional partner elicited per case interviewed (no details were given on how many partners were listed in first interviews, however) (40). Moreover, many investigators have reported qualitative or anecdotal

evidence that reinterviewing results in more partners being elicited (and, in some cases, located) (41-48).

### Recommendation

Reinterviewing appears to be a productive activity for PN, although it may entail significant resources to implement beyond very occasional or limited use. To determine how reinterviewing might be prioritized, the case correlates of successful reinterviews (in terms of number of additional partners elicited, located, and newly diagnosed) should be investigated.

### Interview periods

In disease control jargon, “interview period” refers to the period for which cases are asked to recall partners. Recommended interview periods vary by disease (38), although a wide range of interview periods have been used and reported in the literature for the same infection. Ideally, interviewers define the interview period explicitly for the patient before eliciting partners, noting the beginning point and anchoring it with a landmark event that is personally significant to the patient.

Two teams have studied the impact of extending interview periods beyond the recommended lengths on case finding in gonorrhea and chlamydia PN. Starcher and colleagues elicited gonorrhea cases’ partners for the 120 days before treatment, in contrast to the 30 days prior to treatment recommended by CDC at the time (49). They observed that 21% of male cases’ named female partners within the 30 days before

treatment were newly diagnosed cases, but only 9% of those between 31 and 60 days prior to treatment and 1% of those beyond 60 days were new cases. Up to 7% of newly diagnosed cases in female partners may have been missed if a 30-day interview period had been used; no more than 1% would have been missed with a 60-day period.

Fifteen percent of female cases' named male partners within the 30 days prior to treatment were newly diagnosed cases, as were 13% and 5% of those in the 31 to 60 days and more than 60 days prior to treatment, respectively. Up to 30% of newly diagnosed cases in male partners might have been missed had a 30-day interview period been used, and up to 5% might have been missed had a 60-day interview period been used.

Over 12 months in 1996-7, Zimmerman-Rogers and colleagues elicited chlamydia cases' partners for the 180 days prior to treatment, in contrast to the 60 days prior to treatment recommended by the CDC (50). They found that 14% of male cases' named female partners within the 60 days before treatment were newly diagnosed cases, but that only 1% beyond that time were. Twenty-two percent of female cases' named male partners within the 60 days prior to treatment were newly diagnosed cases, and 4% beyond that period were. Up to 4% of newly diagnosed cases in female partners and 14% of new cases in male partners might have been missed had a 60-day interview period been used. More importantly, the newly diagnosed cases in male partners who were reported by female index cases at more distant points in time were much more likely to have been asymptomatic and had more sexual partners on average than other male cases, highlighting the central role they probably play in maintaining endemicity.

Thus, in communities that lack targeted screening programs for men, it may be worthwhile to use interview periods as long as 6 months for chlamydia PN.

Extending interview periods for syphilis PN beyond standard recommendations has been productive in some communities with a high prevalence of syphilis. Rothenberg and colleagues' analysis of an outbreak of early syphilis among young people in suburban Atlanta suggested that partnerships relevant to transmission were missed by adhering to the standard interview periods for syphilis PN (51). Stuart also cited an unpublished study from Michigan in the 1940s—when syphilis prevalence was much higher than it is currently—in which investigators elicited syphilis cases' partners "... over a period extending much further back than the time usually covered in contact interviewing" (p. 245) and found previously undiagnosed cases as a result (40).

### Recommendations

- 1) Taken together, these reports suggest that interview periods can be extended beyond CDC guidelines in populations with high disease prevalence and low levels of screening. Such extensions might also be useful, even with substantial declines in the percentage of new cases found in temporally more distant partners, if incidence is low and disease elimination is a priority.
  
- 2) Investigate the possibility that longer recall periods promote forgetting of partners. My colleagues and I have found that forgetting, by several measures, is greater for longer recall periods. More critically, longer recall periods may induce forgetting of

recent partners, as suggested by research on recall of autobiographical events (52). Two experiments manipulated the length of interview period (5, 26), and these data should be analyzed to address this issue.

### Elicitation techniques

CDC materials and other resources give comprehensive recommendations about the interpersonal, motivational, cognitive, and logistical/practical aspects of interviewing in PN (7, 38, 53-61). Very few of these recommendations are based on empirical scientific research. Much of the received wisdom about elicitation techniques in PN comes from the work of Kinsey and his colleagues (59). While some aspects of this interviewing paradigm have since been validated and become standard methods in many types of interviewing (e.g., asking open-ended questions), most others have not.

The research to date on elicitation techniques for PN has focused on cognitive strategies to enhance recall of partners, including order in which partners are elicited, prompting, and recall cues. My colleagues and I have evaluated these elicitation techniques in PN and research contexts in Seattle and Colorado Springs between 1996 and 2002 with interview periods ranging from three to 24 months (5, 24, 32) (Brewer, Hagan et al., unpublished data). In these studies, we first asked interviewees to list their sexual and injection partners (separately) as completely as they could. It has long been considered crucial by the CDC and other STD investigators to elicit partners in reverse chronological order (from the most recent or current partner to progressively earlier partners) (61-63). We tested this assertion in a randomized trial comparing

elicitation of partners in reverse chronological order with free recall, in which interviewees were given no instructions as to the order in which they were to list partners (24). The results showed that the two approaches elicited nearly identical numbers of sexual partners on average.

In our studies, when an interviewee indicated that he or she did not have or could not recall any more partners (in response to the initial elicitation question), we prompted nonspecifically (e.g., "Who else have you had sex with in the last 12 months?"). We prompted in this way until the interviewee insisted that he or she could not recall additional partners. At that point in the interview, we read the list of partners already elicited back to the interviewee slowly to ensure that all partners were correctly recorded and prompted nonspecifically again. Nonspecific prompting and reading back the list of elicited partners each elicited 5-10% additional partners beyond those already mentioned in the interview, on average.

My colleagues and I sought to develop and test recall cues to enhance elicitation further. We studied how people naturally recall partners and then designed recall cues that imitate or exploit these tendencies in how people organize partners in memory (64). We initially evaluated four different sets of experimental recall cues (locations, elicited partners as network cues, role relationships, and personal timeline) in a randomized controlled trial (with letters of the alphabet as control cues) with men who have sex with men, drug injectors, and heterosexuals with multiple recent partners (32). All of the sets of recall cues were at least somewhat effective in eliciting additional partners, although

their effectiveness and time efficiency varied moderately. In combination, the five sets substantially increased the number of partners elicited substantially (by 40% for sexual partners and 123% for injection partners, on average)—approximately 2-3 times more effective in eliciting additional partners than a second interview (5). The cues were more effective in eliciting additional injection partners than in eliciting additional sexual partners, which is consistent with the greater degree of forgetting of injection partners (5, 24, 25). Parallel to the profile of which individuals forget the most (5), interviewees who recalled many partners on their own tended to forget the most partners. Very few subjects who recalled only one partner on their own listed any additional partners in response to the cues. Also, cue-elicited and freely recalled partners did not differ meaningfully on epidemiologically significant variables.

We evaluated the supplementary elicitation techniques (nonspecific prompting, reading back the list, and recall cues) in a PN context in Colorado Springs (32). We tailored the recall cues from the prior work to the local setting, left behind the time-intensive personal timeline cues, and bundled the remaining sets of cues. We compared this combined set with another experimental set of cues—common first names—and a new set of control cues based on individual characteristics (different ways people look, sound, and smell). We conducted a randomized trial of these three sets of cues with gonorrhea, chlamydia, and syphilis cases interviewed for routine PN. We observed the same mild increases in partners elicited from nonspecific prompting and reading back the list as in our previous two studies. The combined cues from the earlier work—primarily the location cues—were the most effective in eliciting additional partners, and



the location cues and first name cues were the most effective in eliciting additional partners who were located by disease control staff. Partners elicited by the supplementary techniques were as likely to be infected as those elicited before the techniques were administered. Across all arms of the trial, the supplementary techniques increased the number of new cases found by 12% and identified branches of the sexual network that likely would not otherwise have been discovered.

My colleagues and I performed another evaluation of the supplementary techniques in a study of injection networks and hepatitis C virus (HCV) transmission in Seattle in 2000-02. In this study, interviewers administered location and network cues (which involve the interviewee thinking about others who know or interact with a particular partner already elicited) after interviewees had recalled freely and interviewers had prompted nonspecifically and read back the list of partners. The location and network cues, in combination, elicited 44% additional injection partners on average. Partners elicited by the supplementary techniques were somewhat less locatable by the interviewee. However, HCV prevalence was similar for the freely recalled (42%) and technique-elicited partners (34%) who were tested.

In my observations, disease control staff did not consistently define what behaviors constituted “sex” prior to eliciting sexual partners. Rather, interviewers tended to define “sex” only in the infrequent situation where the case asked for clarification or responded in a way that indicated he or she had a different definition than the interviewer. Only rarely have I observed DIS prompt nonspecifically, use recall cues (and never

systematically or comprehensively), or suggest the case use memory aids (such as address books, etc.) during PN interviews.

### Recommendations

- 1) To save time and prevent misunderstanding, PN interviewers should explicitly define what constitutes sex, for purposes of the interview, prior to eliciting partners.
  
- 2) For HIV PN interviews with drug injectors, injection partners, rather than just needle-sharing partners should be elicited and pursued. Injection partners include a more complete set of exposed persons—exposed through sharing of needles and other injection paraphernalia, syringe-mediated drug sharing, needlestick injuries/accidents, giving injections to others, and receiving injections from others (5).
  
- 3) Many of the CDC guides on PN interviewing urge a problem solving approach – that is, applying particular motivations to the problems the interviewer perceives the patient has about reporting partners and their identifying and locating information. It is possible that much of this activity could be circumvented by systematically prefacing each interview with brief statements that address these problems and motivations.
  
- 4) The randomized trials of recall cues should be replicated, and in such studies the cues could be further refined to a smaller set that retains most of the impact. The

supplementary techniques also should be evaluated in different interviewing modes and could be modified and tested for eliciting cluster suspects and associates.

Furthermore, it would be useful to assess the value of reinterviewing after applying these techniques in an initial interview, because the “elicitation value” of reinterviewing may drop considerably as a result.

- 5) The motivational and interpersonal aspects of the PN interview should be evaluated systematically. Randomized trials could be conducted for such recommended techniques as supplying possible answers in random order to patients immediately after asking the question (e.g., “How many different people have you had sex with this year; 5, 2, 30, more?”), which is believed to convey a non-judgmental attitude and the range of realistic responses (59, 60).

#### Interviewer effects

There is a long history of research in the social and health sciences on how interviewers affect the quality and quantity of reported data (65). There are at least three sources of interviewer effects, including interviewer characteristics (such as race, sex, and age), the (dis)similarity of interviewer and interviewee characteristics, and interviewer behavior (such as elicitation techniques and interpersonal style). The available evidence shows few or no effects of interviewer characteristics or the (dis)similarity of interviewer and interviewee characteristics on reported STD/HIV risk behaviors in surveys (66-69).

Interviewer behaviors are much more likely to influence data quality and quantity than interviewer characteristics. For instance, Fowler and Mangione (65) found that open-ended questions that required a significant amount of probing and detailed recording may be most susceptible to interviewer effects, perhaps due to variation in interviewer probing behavior. Indeed, Fowler (70) noted that “probing is the skill that requires the most interviewer judgment” (pp. 275-6). It is precisely these kinds of open-ended questions which require a significant amount of probing that make up the core of PN interviews.

Several studies showed that trained interviewers (e.g., disease intervention specialists (DIS), nurses, and social workers) elicited more partners than untrained interviewers, such as physicians (40, 41, 71). The assumption in these and other studies is that all elicited partners are genuine or valid. However, it may be that basic interviewing training, not even specific to PN, is sufficient for adequate performance in PN interviews. Rosenberg and colleagues compared traditionally trained disease control staff (DIS) with research interviewers who had received two days of training on “interviewing techniques, with special emphasis on anthropological methods at ascertaining ‘sensitive’ behavioral information” (p. 9) (72). Both sets of interviewers interviewed early syphilis cases in the environs of Baton Rouge in 1996-97. The research interviewers first elicited early syphilis cases’ social contacts of index cases and asked with which of these persons they had sex with. Then the research interviewers elicited other sexual partners who were not social contacts. The results

showed no differences between DIS using traditional techniques and the research interviewers in terms of the number of partners elicited, located, or newly diagnosed.

Interviewer effects in the elicitation of personal networks in surveys are prominent, despite the use of extensively trained survey interviewers. Both Marsden and VanTilburg found that interviewer effects on the number of personal network members elicited persisted even after controlling for characteristics of respondents and interviewers (73, 74).

There are few indications in the published literature as to whether interviewer effects exist in PN interviews. In an ecological analysis, Rion and Abraham (75) found that variation in the number of sex partners elicited by staff in ten US states in 1946-47 was not due to differences between areas in the race and sex distribution of syphilis cases. Staffs that elicited comparatively many partners in one race/sex category also elicited comparatively many partners in other race/sex categories. This pattern of results could be due to interviewer effects and/or differences in cases' behavior (regardless of race or sex) across areas. In 38 contact interviews conducted with early syphilis cases in Atlanta, Chicago, and Atlanta by federal DIS in 1991, there was a positive correlation between length of tenure as a DIS and length of interview ( $r = .39$ ) (27). My colleagues and I are currently analyzing interviewer effects (interviewer behavior, interviewer characteristics, and (dis)similarity of interviewer and interviewee characteristics) in multiple PN and research study data sets. We hope to report the results within the next

12 months. Such analyses may suggest recommendations for interviewing practice and further research on the topic.

#### Reliability and validity of reported partner information

In addition to eliciting partners, another key aspect of PN interviewing is to collect detailed and accurate locating and identifying information about partners, information about partners' risk for transmission, and data on partnership timing. Gonorrhea and chlamydia cases in Seattle in 1992-94 reported demographic information about their partners (e.g., race and age) quite reliably (as indicated by comparison of cases' reports with partners' self-reports). These cases, however, reported information about their partners' risks for transmission (number of partners, involvement in commercial sex, bisexual behavior, and injection drug use) with only low to moderate reliability (76, 77).

Research on the reliability of reported partnership timing is similarly sparse. In one study, Dutch STD cases and partners they referred for examination reported the date they first had sex with each other (78). Fourteen percent agreed exactly on the date of first sex, 41% agreed within the same month and year, and 82% agreed within the same year (Spearman's  $\rho = .94$ ). In their study of an outbreak of early syphilis among teenagers in suburban Atlanta in 1996, Rothenberg and colleagues found that 9 pairs of sexually linked early syphilis cases (a subset of those individuals who named each other as partners) reported similar dates of first and last sexual contact with each other (51). In other studies, persons in regular or long-standing partnerships but who were not STD/HIV cases displayed high interpartner agreement on the date they first met or

dated and duration of sexual partnerships, but only low to moderate agreement on the time between the first meeting/date and first sex (79-81).

Interview periods may also influence the accuracy of reported partnership timing.

Huttenlocher and colleagues randomized undergraduates to recall movies seen at a university cinema from either the last two or last eight months and then date these events (52). Subjects who recalled for the two month period dated the movies in the last two months more accurately (58% less error) than did subjects who recalled for the eight month period. By extrapolation, these results suggest that longer interview periods may produce more unreliability in reported partnership timing, even for recent partners.

### Recommendations

- 1) Assess the extent to which cases give apparently false partner information, as indicated by addresses that do not exist and addresses or telephone numbers that belong to other people than reported who have had the address/telephone number for a long duration. The same research should also examine case and partnership correlates of such misreporting to determine the situations in which it is most likely to occur.
  
- 2) Although it seems that STD cases have only crude knowledge of the number of partners their partners have had, it would be worthwhile to investigate how many partners of their partners they could identify and the reliability of such reports. The

partners of partners may include partners of known cases (i.e., “suspects and associates”: S-2s and A-2s). If cases can reliably identify partners of their partners, this additional elicitation may prove to be a fruitful exercise for delineating the networks that support transmission more quickly and fully. This approach might also pay dividends in efforts to control rapidly expanding outbreaks.

- 3) CDC guides (38) and training emphasize that interviewers should scrutinize a case’s reported sexual history for “exposure gaps” – periods during which a case reports not to have had sex—as they may indicate the presence of unreported partners. This notion has not been investigated in empirical research. That is, it is not known to what extent STD/HIV cases and others at high risk exhibit constancy or variability in partner acquisition over time. Plentiful PN and other data exist with which to explore these issues. Similarly, research on the reliability of reported partnership timing (see recommendation 4) might also indicate whether reporting error contributes to the existence of apparent exposure gaps.
- 4) Existing PN and other data should also be analyzed to examine the reliability of the reported dates of first and last sexual contact with a particular partner, partnership duration, and partner temporal ordering. The same data can also be used to assess potential individual and partnership correlates of reliability of reported sexual partnership timing and investigate the response processes (e.g., heaping (82) and temporal schemes) STD/HIV cases and others use when reporting partnership dates.



- 5) Evaluate the impact of interview period length on reliability of reported partnership timing. Data from two experiments that manipulated the length of interview period (5, 26) could be analyzed for this purpose.

### Conclusions

In 1965, the CDC initiated a large and complex study on contact interviewing that was to focus on “(1) the characteristics of the patient, (2) the characteristics of the interviewer, (3) the exchange (the interview), and (4) the setting (the place where the interview was to be conducted) ... it sought to provide answers as to how patients should be interviewed to identify by name and locate all of their recent sex partners” (p. 163) (83). This landmark study was never completed or published. Unfortunately, because little research has been conducted in this area since then, many interviewing practices in PN still lack a scientific basis.

The most solid evidence, albeit far from overwhelming, indicates that extended interview periods, reinterviewing, prompting and recall cues, and interviewer training each seem to result in additional partners elicited and new cases found. Other aspects of the interview context, interviewing modes, reinterviewing, interview periods, elicitation techniques, interviewer effects, and the reliability and validity of reported partner information remain largely unexplored in scientific research.

Existing data can be analyzed to address many of the critical questions about PN interviewing and thus could relatively quickly put many interviewing practices on sounder empirical footing or point to more effective strategies. The cost of new studies needed to address other questions should be inexpensive compared to most epidemiologic research, as the studies would involve modifying existing, routine PN practices and would not require new staff to deliver the interventions.

Ultimately, it is not crucial that all partners be elicited, located, and examined for every case, as STD/HIV cases are, by definition, connected to each other. Hence, different cases will be linked to the same partners, and this “recursion” permits PN to be effective even without complete data from each case interviewed (84). Nonetheless, improved interviewing practices would serve to arrest transmission earlier and alleviate the need to rely on network recursion for identifying the persons involved.

Other areas of PN practice also require overhaul to enhance any benefits from improved interviewing practices. One priority should be to transform inefficient, cumbersome, and labor-intensive record systems based on paper forms completed by hand into modern computerized data capture, entry, and management systems. This change would increase dramatically the accessibility, accuracy, completeness, timeliness, and utility of PN data—especially if joined with expanded and standardized behavioral surveillance (85)—and reduce the clerical and administrative burden on disease control staff considerably.

Similarly, disease control staff play a critical role in implementing the interviewing practices discussed in this report. If public health officials expect control staff to adhere to professional standards, stay in their positions, strive for performance improvements, embrace their public health mission and strategies, and use innovative approaches, then control staff must be treated as professionals. This includes, on one hand, professional-level compensation and rewards for superior individual performance. On the other hand, it also means that control staff should meet more rigorous entry requirements (e.g., bachelor's degree, facility with computers, effective interpersonal skills, etc.) and must be held accountable for their individual performance. It appears that this constellation of job features rarely comes together in US health departments, but it is likely that such a combination will be necessary for PN to be viable and cost-effective in environments with declining financial resources for STD/HIV control.

Interviewing practices for PN represent an area where much improvement appears possible. A comprehensive program of research focused on interviewing gives the best chance for realizing such gains and the consequent public health benefits.

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