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Using an Email Alert to Improve Identification of Pregnancy Status for Women With Syphilis—Florida, 2017–2018

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Abstract

Background—Congenital syphilis can be prevented if syphilis is treated early in pregnancy. Identifying women with syphilis who are pregnant facilitates prioritization for follow-up. In 2016, Florida reported 1062 female syphilis cases, aged 15 to 44 years, and 160 (15%) cases were missing pregnancy status. The Florida Department of Health developed a system generated weekly email notification sent to local program staff for all female syphilis investigations with unknown pregnancy status. We describe the outcome of these efforts to reduce unknown pregnancy status among women with syphilis.

Methods—Review of the frequency and outcomes (reduction in investigations flagged and change in pregnancy status variable) of the first email notification (October 2, 2017) were compared with subsequent notifications through June 25, 2018. In addition, we reviewed pregnancy status of reported female syphilis cases (age, 15–44 years) from 2013 to 2018.

Results—The first email notification listed 76 investigations with unknown pregnancy status. This number decreased to 40 in 1 week and to 22 by 1 month. The decreased volume continued through June 2018 ($n = 13$). Of the original 76 investigations, 3 women were pregnant, and 38 (50%) were determined to meet the syphilis case definition (including 1 who was pregnant), hi 2017, pregnancy ascertainment for female syphilis cases reached 98%.

Conclusions—Focused efforts using email notification to obtain pregnancy status improved ascertainment in large sexually transmitted disease (STD) programs with minimal effort. Most but not all women with unknown pregnancy status were identified as not pregnant.

Primary and secondary syphilis among women in the United States increased 109% from 2012 ($n = 1458$) to 2016 ($n = 3049$).¹ Moreover, congenital syphilis infections have increased each year since 2012 to 628 reported cases in 2016 (15.7 cases per 100,000 live births). In 2016, health care intervention averted 75% of potential congenital syphilis cases.² Successfully intervening in potential congenital syphilis cases requires timely testing, diagnosis, and treatment of pregnant women with syphilis.³ Many studies describe the gaps and challenges in timely diagnosis and testing of syphilis in pregnant women, but rarely

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focus on the challenges of pregnancy ascertainment.^{2,4–8} Timely ascertainment of pregnancy status may lead to improved surveillance for maternal and congenital syphilis, prioritization of maternal syphilis case management, and linkage to other services available only to pregnant case-patients.

In 2017, the Centers for Disease Control and Prevention issued a “Syphilis Call to Action,” which along with other experts, recognized the need to improve surveillance and reduce missing pregnancy status among females with syphilis.^{9,10} In 2016, 20% of reported female syphilis cases nationally had missing or unknown pregnancy values.² Data from 2013 to 2014 in Florida and Louisiana showed that across high-morbidity programs this value can vary substantially (10% vs. 44%, respectively).⁴ In 2016, the missing pregnancy percentage in Florida reached 15.1% (160 of 1062 cases) exceeding the Florida Department of Health’s target of less than 5%.

In response, the Florida Department of Health focused efforts on reducing missing pregnancy status among females with syphilis in 2017. The main focus of these efforts was to develop an alert sent to local program staff and managers as part of a weekly system-derived email called the “Critical Intervention Task List.” Starting in October 2017, an alert was generated for any female syphilis investigation (age, 15–44 years) with a missing or unknown pregnancy value and sent via email every Monday to a local program staff for follow-up, often through a phone call to the provider or a review of medical records to obtain the missing pregnancy status of the patient. Having this alert initiated on investigations, rather than after a case was reported meant that the notification would be triggered sooner in the process, often after electronic laboratory reports, but could also involve investigations of reactive syphilis laboratory results that do not lead to a case like biological false-positive or serofasting individuals or without reactive syphilis laboratory results like identified female sex partners to a person with a reported syphilis infection. The aim of this study was to evaluate the impact email alert would have on missing pregnancy status, whether the impact was sustainable and timely, and the outcomes of the investigations.

METHODS

Critical Intervention Task Lists were reviewed beginning October 2, 2017, the date of the first task list that contained syphilis investigations for women with missing pregnancy status regardless of stage of disease. These lists were reviewed weekly for the first 3 weeks and then monthly through June 25, 2018. Task lists were reviewed for: total number of flagged investigations on selected date missing pregnancy status, change in pregnancy status, case status of the investigations, and (for the first 3 weeks) timeliness of observed changes to pregnancy status for flagged investigations on the list.

We also retrospectively reviewed the pregnancy status of every reported female syphilis cases from January 1, 2013, through June 20, 2018, to examine observed pregnancy status prior to and during implementation of the email alert notification. Cases from 2018 are provisional. Cases were extracted from Florida Department of Health’s STD information system, Patient Reporting Investigation Surveillance Manager, using the specimen collection

date as the event date. We measured the annual percentage of female syphilis cases with missing or unknown pregnancy status. All data submitted to Patient Reporting Investigation Surveillance Manager are part of routine STD surveillance activities. The project was reviewed by the Florida Department of Health Institutional Review Board Office and classified as “exempt”; it was determined to be public health practice not research involving human subjects (IRB protocol number: 2018-048).

RESULTS

On October 2, 2017, 76 female syphilis investigations with missing or unknown pregnancy status met the criteria for inclusion on the first Critical Intervention Task List containing the new alert (Fig. 1). By the next week, the Task List was reduced by 40 investigations (38 from the previous week and 2 new investigations). By the following week, another 18 investigations from the original list had updated their pregnancy status, both of the 2 new investigations from week 2 had their pregnancy status updated, and 4 new investigations were added (and closed by the next week as well). From November 2017 through June 2018, the volume of weekly investigations missing pregnancy status ranged from a low of 13 investigations in June 2018, an 83% decrease from initial list, to 29 investigations listed in February 2018.

Ultimately, 63 (83%) of the original 76 investigations with missing pregnancy status had a reported pregnancy status (Fig. 2). Of these 63 investigations with an obtained pregnancy status, 60 were identified as not pregnant and 3 were identified as pregnant. Following a complete investigation, which includes a review of the patient’s syphilis history, 38 (50%) of the 76 investigations from the first week met the case definition for a new syphilis infection. Only 1 of the 3 pregnant women had syphilis. The pregnant woman with syphilis on the Critical Intervention Task List on October 2, 2017, was treated early in pregnancy and her baby did not meet the case definition for congenital syphilis. Of the 13 investigations with remaining unknown pregnancy status, only one met the definition for a reportable case of syphilis, thus pregnancy status was obtained for 37 (97%) of 38 true cases of syphilis from the initial Task List.

From 2013 to 2016, reported syphilis cases among females aged 15 to 44 years increased from 673 to 1062 cases, whereas the number of these with missing pregnancy status increased from 33 to 160 (Table 1). This led to an increase in percentage of female syphilis cases with missing pregnancy status from 4.9% to 15.1%. In 2017, the number of female syphilis cases aged 15 to 44 years increased to 1265, but the number with missing pregnancy status decreased to 23 (1.8%). This trend continued as of June 20, 2018, when pregnancy status was missing for only 6 (1.1%) of 559 reported female syphilis cases (age, 15–44 years) in the first half of 2018.

DISCUSSION

Focusing efforts to reduce missing pregnancy status in Florida showed it was possible to obtain greater than 98% pregnancy ascertainment in a high morbidity program. The email alert tool developed by the Florida Department of Health improved timely identification of

pregnancy status for most reported syphilis cases in women. Obtaining pregnancy status for women with syphilis is obtainable at a low cost.¹⁰ Missing pregnancy status in Florida was resolved with a phone call or review of medical records from the providers. Although this notification is an added task for existing staff, the sustained reduction in female syphilis investigations missing pregnancy status suggests that collecting this information can become routine. A routine review of vital statistics records confirmed that the quality of our pregnancy ascertainment data was high; none of the female syphilis cases deemed “nonpregnant” by our 2017 efforts delivered a baby in the following 10 months. Our simple systems-level intervention increased pregnancy ascertainment and may have helped prevent a case of congenital syphilis during the short period of implementation.

Most women with missing pregnancy status were identified as nonpregnant. However, 3 women were found to be pregnant including one who had syphilis. Although adding this tool may have less impact in preventing congenital syphilis cases than increased screening and testing, it can be part of an STD program’s repertoire to improve data quality and aid in the female syphilis investigation process.^{2,4}

The addition of missing pregnancy status alerts to a weekly email alert system provided valuable timely information to program staff that resulted in a sustained increase in pregnancy ascertainment for pregnancy status. The email alert system is an automated system generating weekly notifications using Structured Query Language, making this tool easily replicated elsewhere with minimal maintenance or resources. One limitation of the evaluation is that we were unable to assess the direct cost or opportunity cost to the program of ascertaining additional pregnancy statuses. Further information on the costs and benefits of developing and implementing email alerts in other settings would be helpful to programs considering implementation of a similar approach. This approach may also be beneficial to programs seeking to reduce other perinatal infectious diseases, including HIV and hepatitis B.

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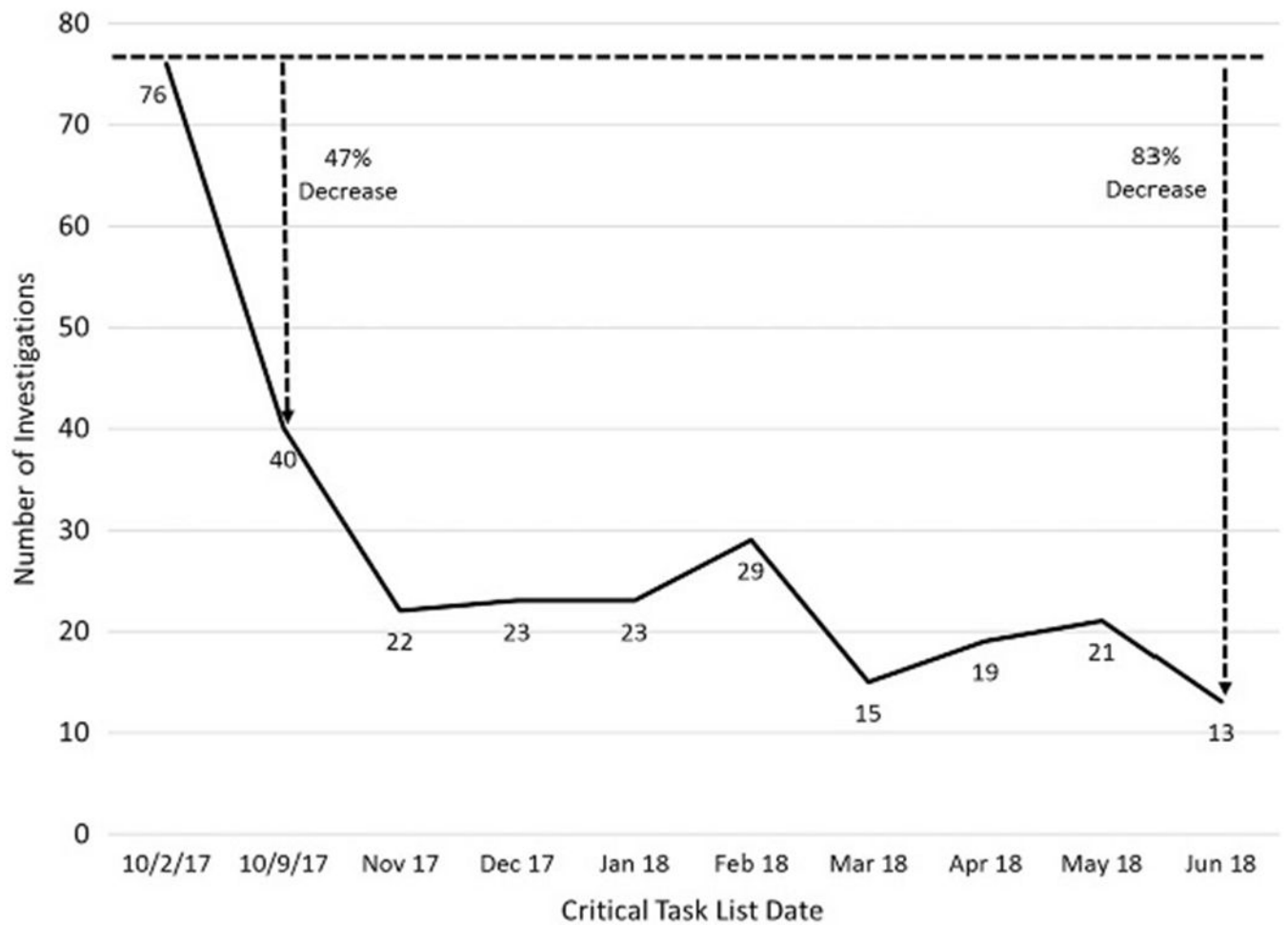


Figure 1.

Number of female syphilis investigations with unknown or missing pregnancy status reported on the Critical Intervention Task List in Florida for the first 2 weeks (October 2, 2017 and October 9, 2017) and then monthly through June 2018. The solid line represents the number of investigations at each date. The number of investigations with unknown status had decreased by 47% by week 2 (October 9, 2017) and by 83% by June 2018.

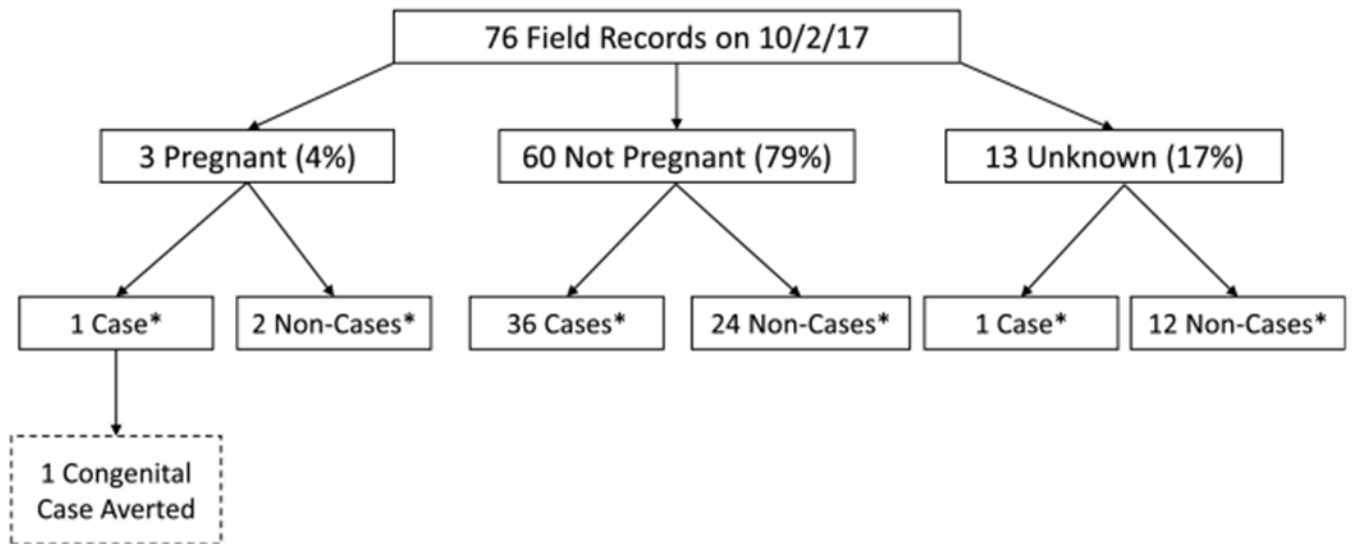


Figure 2.

Flow diagram representing the final pregnancy status outcomes of the 76 female syphilis investigations with unknown or missing pregnancy status reported on the initial Critical Intervention Task List in Florida on October 2, 2017. * Cases and noncases refer to case determination for adult female syphilis cases.

TABLE 1.Pregnancy Status of Reported Female Syphilis Cases, Aged 15–44 Years, in Florida, 2013–2018^{*}

Report Year	Female Syphilis 15–44 y	Missing Pregnancy	% Missing
2013	673	33	4.9%
2014	811	97	12.0%
2015	909	101	11.1%
2016	1062	160	15.1%
2017	1265	23	1.8%
2018 [*]	559	6	1.1%
Total	5279	420	8.0%

^{*} 2018 data were extracted on June 20, 2018, for closed and reported cases of syphilis at that date. 2018 data subject to change as more cases are closed and reported in the reporting year.