

Association of Universal Bilirubin Screening With Socioeconomic Disparities in Newborn Follow-up

Elizabeth Kathleen Darling, RM, PhD; Timothy Ramsay, PhD;
Doug Manuel, MD, MSc, FRCPC; Ann E. Sprague, RN, PhD;
Mark C. Walker, MD, MSc, FRCSC; Astrid Guttmann, MDCM, MSc

From the Population Health Doctorate Program (Dr Darling), School of Epidemiology, Public Health and Preventive Medicine (Drs Ramsay, Manuel), Department of Obstetrics and Gynecology (Dr Walker), University of Ottawa; BORN Ontario (Dr Sprague), Ottawa, and Institute for Clinical Evaluative Sciences (Drs Manuel and Guttmann), Toronto, Ontario, Canada

The authors have no conflicts of interest to disclose.

Present address for Dr Darling: School of Midwifery, Laurentian University, Sudbury, Ontario, Canada.

Address correspondence to Astrid Guttmann, MDCM, MSc, Institute for Clinical Evaluative Sciences, G-Wing, 2075 Bayview Ave, Toronto, Ontario M4N 3M5, Canada (e-mail: astrid.guttman@ices.on.ca).

Received for publication December 11, 2015; accepted July 27, 2016.

ABSTRACT

OBJECTIVE: To determine whether implementation of universal bilirubin screening in Ontario, Canada is associated with improved rates of recommended follow-up care across socioeconomic status (SES).

METHODS: We conducted a retrospective population-based cohort study of all babies born at ≥ 35 weeks' gestation and discharged to home within 72 hours from 97 hospitals between April, 2003 and February, 2011. We used linked administrative health data sets to measure recommended follow-up care (physician visit within 1 day of discharge for babies discharged ≤ 24 hours after birth, or physician visit within 2 days for babies discharged 24–72 hours after birth). We used maternal postal code and the Canadian Deprivation Index to determine material deprivation quintile. We modeled the relationship between universal bilirubin screening and outcomes using generalized estimating equations to account for clustering according to hospital, underlying temporal trends, and important covariates.

RESULTS: Universal bilirubin screening was associated with a modest increase in recommended follow-up from 29.9% to 35.0% ($n = 711,242$; adjusted relative risk: 1.11; $P = .047$). Disparity in recommended follow-up increased after screening implementation, with 40% of the crude increase attributable to the highest SES quintile and none to the lowest SES quintile.

CONCLUSIONS: Universal bilirubin screening has had only a modest effect in ensuring timely follow-up for Ontario newborn babies, which represents an ongoing weakness in efforts to prevent severe hyperbilirubinemia. The observed increase in SES disparity in access to recommended follow-up suggests that universal programs that fail to address root causes of disparities might lead to overall improvements in population outcomes but increased inequity.

KEYWORDS: health care disparities; infant; jaundice; mass screening

ACADEMIC PEDIATRICS 2017;17:135–143

WHAT'S NEW

The implementation of universal bilirubin screening within the context of universal health care coverage was associated with a modest increase in appropriate follow-up but increased socioeconomic disparity in follow-up. Barriers to timely follow-up remain an obstacle to prevention of severe hyperbilirubinemia.

THE SERIOUS LONG-TERM sequelae associated with severe neonatal hyperbilirubinemia have led several organizations to develop clinical practice guidelines that provide screening and treatment recommendations.^{1–3} Newborn bilirubin levels typically peak between day 3 and 5 of life, after most babies born in the hospital have been discharged. Lack of timely follow-up can delay the diagnosis and treatment of severe hyperbilirubinemia, and increase the risk of long-term sequelae.⁴ Cohort studies on the effectiveness of universal bilirubin screening identi-

fied failure to keep scheduled follow-up appointments as contributing to cases of severe hyperbilirubinemia.^{5,6} Follow-up within 24 to 48 hours of hospital discharge is recommended, particularly if infants are discharged within 72 hours of birth.^{7,8} The Canadian Paediatric Society (CPS) 2007 hyperbilirubinemia guidelines tightened a previous recommendation that newborn babies be assessed within 48 hours of early discharge⁹ to specify that infants discharged in the first 24 hours of life should be assessed within 24 hours.¹

Neonatal hyperbilirubinemia research has not examined the role of socioeconomic status (SES) with respect to missed follow-up, but there is evidence that even with universal health insurance there is socioeconomic disparity in health care use by newborn babies.¹⁰ To explore potential disparities in the degree of benefit derived from guideline implementation, we examined follow-up outcomes associated with the implementation of universal bilirubin screening in response to the CPS 2007 hyperbilirubinemia

guidelines in Ontario (Canada's largest province: population 13 million). The objective of our research was twofold: to determine whether implementation of universal bilirubin screening was associated with 1) an increase in use of recommended follow-up care for newborn babies discharged to home from hospital within 72 hours of birth, and 2) a differential effect between material deprivation quintiles. We expected to find disparities in access to recommended follow-up care on the basis of SES, and hypothesized that after screening implementation, appropriate follow-up would increase but that disparities would persist.

METHODS

STUDY DESIGN

This was a population-based retrospective cohort study of all newborn babies discharged to home from an Ontario hospital within 72 hours after birth between April 1, 2003 and February 28, 2011. We surveyed all 100 Ontario hospitals that provide maternal-newborn services as of March 2011 to determine if and when hospitals had implemented universal bilirubin screening, and included births from the 97 responding hospitals. The survey methods and findings have been reported previously.¹¹ Survey data were linked with encoded administrative health data sets held at the Institute for Clinical Evaluative Sciences. Scrambled health insurance numbers of mothers and infants were used to link across the administrative health data sets. The study cohort was created using matched maternal and newborn records from the Canadian Institute for Health Information hospital Discharge Abstract Database (DAD). Additional data sources were the Ontario Health Insurance Plan (OHIP), which includes physician billings and the Canadian Institute for Health Information National Ambulatory Care Reporting System (NACRS) for emergency department visits. Research ethics approval was obtained from the Ottawa and Sunnybrook Hospital research ethics boards.

INCLUSION/EXCLUSION CRITERIA

Inclusion criteria included gestational age ≥ 35 weeks (the target population of the CPS guidelines), a valid health insurance number, linkage to a single maternal health record (to create covariates), and discharge home within 72 hours of birth. We excluded babies transferred to another facility, babies who died on the day of discharge, and higher order multiples. We randomly excluded 1 twin from twin sibling pairs in anticipation that their outcomes would be correlated. We excluded babies born to mothers who received midwifery care because the standard of care is follow-up within 1 day of discharge, and our objective was to examine the effect of the guidelines on babies cared for by physicians. To identify mothers who were recipients of midwifery care, we examined maternal OHIP records during a 9-month look-back window preceding the birth to identify codes for midwife-requested consultations, and examined service provider codes on the mother's delivery record in the DAD.

VARIABLE DEFINITION

The exposure of interest was discharge from a hospital that had implemented universal bilirubin screening. Our hospital survey collected the year and month of screening implementation. When month was missing we imputed the month to be July (halfway through the year). When year was missing we imputed the implementation date to be July 2007. Although some hospitals reported implementing universal bilirubin before July 2007 when the CPS guideline was published we only classified babies as exposed if they were born after July 2007 because of inconsistency of earlier practice recommendations around the timing for postdischarge follow-up.

Our primary outcome was recommended follow-up care. The CPS guidelines explicitly recommend follow-up within 24 hours for those discharged within 24 hours of birth, but other follow-up recommendations are on the basis of screening results rather than age at discharge. We considered previous CPS guidelines recommending follow-up within 48 hours⁷ and chose to operationalize our primary outcome for babies discharged between 24 and 72 hours after birth as follow-up within 48 hours after discharge. Follow-up visits were identified using physician billing records from OHIP and emergency department visits in NACRS (in some rural areas scheduled primary care visits occur in emergency departments). We used fee codes (OHIP) and diagnostic codes (NACRS) for primary care visits to construct the follow-up outcome (details available upon request). As a sensitivity analysis we examined follow-up within 7 days of discharge.

We controlled for important clinical, health service, and sociodemographic variables. We established the following list of covariates a priori: gestational age category, birth mode, maternal parity, maternal residence, timing of recommended follow-up, maternal age at first delivery, and maternal prenatal care provider. Maternal prenatal care by a family physician was included as a marker of potential access to a primary care physician who could also provide newborn care. We classified women as having prenatal care from a family physician if they had at least 1 prenatal visit billed by a family physician or a general practitioner. (Details of data sources used to create the covariates are available upon request.)

We measured SES using neighborhood material deprivation quintile. This variable was derived from maternal postal code from the mother's hospital record using the Pampalon Deprivation Index for Canada.¹² Material deprivation in this index is most influenced by neighborhood income, education, and employment. We selected this measure because income and education are associated with access to care and we did not have individual level data on these variables.

STATISTICAL ANALYSIS

To present the basic time trends for all babies in the cohort regardless of guideline implementation status, we graphed the trends over time in rates of recommended

Download English Version:

<https://daneshyari.com/en/article/5717042>

Download Persian Version:

<https://daneshyari.com/article/5717042>

[Daneshyari.com](https://daneshyari.com)