Newborn Hearing Screening Programs: A Truly Canadian Perspective

Programmes de dépistage de la surdité chez les nouveau-nés : une perspective véritablement canadienne

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Abstract

The Canadian Newborn Hearing Screening Survey was utilized to assess the state of hearing screening programs in Canada. The survey probed demographics of birthing centres, average length of newborn stay in these centres, nature of the site's hearing screening program, and the number of babies screened. The survey was sent in 1999 to all birthing hospitals identified in Canada (n = 467). Three hundred and eighty-four hospitals responded (i.e., an 82% return rate). Approximately 10% (n = 35) of Canadian hospitals which reported deliveries had a newborn hearing screening program of any type. The centres that had hearing screening programs accounted for 25% of the infants born in Canada during the survey period. Most provinces had at least one hearing screening program with the exception of Nunavut and Yukon. Just over half of the screening programs were situated in rural areas (51%) and the remainder in urban centres (49%). Most centres with screening programs used either a high-risk registry or confined screening to a defined target population within the hospital. Of the sites using physiological screening protocols, there was an even split in the number using otoacoustic emissions versus the auditory brainstem response. Seventy-one percent, 57%, 26%, 9%, and 14% of screening programs utilized audiologists, nursing staff, technicians, volunteers and other personnel, respectively. Only 31% of newborn hearing screening sites used a computer-based data management system. These findings suggest that very little progress has been made towards meeting previous recommendations for the identification of hearing impairment in children in Canada.

Abrégé

L'enquête canadienne sur le dépistage de la surdité chez les nouveau-nés a servi à évaluer l'état des programmes de dépistage du Canada. Elle a permis de recueillir des données démographiques des centres de naissance, la durée moyenne de séjour des nouveau-nés dans ces centres, la nature du programme de dépistage de la surdité et le nombre de bébés évalués. Un questionnaire a été distribué en 1999 à tous les hôpitaux de naissance du Canada (n = 467). Trois cent quatre-vingt-quatre d'entre eux y ont répondu (c.-à-d. un taux de réponse de 82 %). Environ 10 % (n = 35) des hôpitaux canadiens qui ont signalé faire des accouchements avaient un programme quelconque de dépistage de la surdité chez les nouveau-nés. Les centres qui avaient un tel programme avaient fait 25 % des accouchements au Canada durant la période couverte par l'enquête. La plupart des provinces comptaient au moins un programme de dépistage de la surdité, sauf le Nunavut et le Yukon. Un peu plus de la moitié de ces programmes étaient offerts en milieu rural (51 %) et les autres en milieu urbain (49 %). La plupart des centres dotés d'un programme de dépistage utilisaient soit un registre des enfants à haut risque, soit la méthode de dépistage conscrit auprès d'une population cible au sein de l'hôpital. Parmi les centres qui utilisent des protocoles de dépistage physiologique, il y en a autant qui ont recours à la technique des oto-émissions acoustiques qu'à celle des potentiels évoqués auditifs. Soixante et onze pour cent des programmes ont recours à des audiologistes, 57 % au personnel infirmier, 26 % à des techniciens, 9 % à des bénévoles et 14 % à d'autres membres du personnel. Seulement 31 % des centres qui font du dépistage de la surdité chez les nouveau-nés utilisent un système informatisé de gestion des données. Ces statistiques laissent croire que peu de progrès ont été accomplis pour mettre en pratique les recommandations précédentes visant à déceler la surdité chez les enfants au Canada.

Key words: newborn hearing screening, neonate, otoacoustic emission, auditory brainstem response

The prevalence of newborn and infant hearing loss has been shown to range from one to six per 1000 live births (Alberti, Hyde, Riko, Corbin, & Abramovich, 1983; Maxon, White, Vohr, & Behrens, 1993; Parving & Salomon, 1996; Watkin, 1996; White, Vohr, Maxon, Behrens, McPherson, & Mauk, 1994). In the United States, the Joint Committee on Infant Hearing (1995) has suggested the goal of universal newborn hearing screening (UNHS) is to identify all infants with hearing loss before three months of age, and that they should receive intervention by six months of age.

In the United States, children with hearing loss are usually not identified until two years of age resulting in significant delays in speech, language, social, cognitive, and emotional development (National Institute of Health [NIH], 1993). Children with hearing loss diagnosed after six months of age have

significant delays in both language and social development. Therefore, late identification of an infant's hearing loss is a significant public health problem. In contrast, early identification of children with hearing loss and intervention prior to six months of age has a significant positive impact on development (Yoshinaga-Itano, Sedey, Coulter, & Mehl, 1998). Yoshinaga-Itano and colleagues discovered that infants identified at birth with mild-to-severe hearing loss and who receive intervention before six months fall within a normal range of language comprehension and expression as well as social development between one and three years of age.

Early identification of hearing loss can be accomplished through the use of either the auditory brainstem response (ABR) or otoacoustic emissions (OAEs). The ABR has been recommended for newborn hearing assessment for almost 15 years (Schulman-Galambos & Galambos, 1979) and is considered the "gold standard." Screening of babies in the neonatal intensive care unit (NICU) with the ABR has been used in the past (e.g., Galambos, Hicks, & Wilson, 1982, 1984; Hyde, Riko, & Malizia, 1990) and follow-up studies of infants screened by this technique demonstrate "acceptable" identification of infants with hearing loss (Kileny & Magathan, 1987; Stein, Ozdamar, Kraus, & Paton, 1983). OAEs are also used for screening/assessment of newborn hearing (Bergman et al., 1995; Bonfils, Uziel, & Pujol, 1988a, 1988b; Stevens, Webb, Hutchinson et al., 1990; Stevens, Webb, Smith & Buffin, 1990; White et al., 1994). Follow-up studies of infants screened by OAEs suggest that this technique can accurately identify infants with hearing loss (Kennedy et al., 1991).

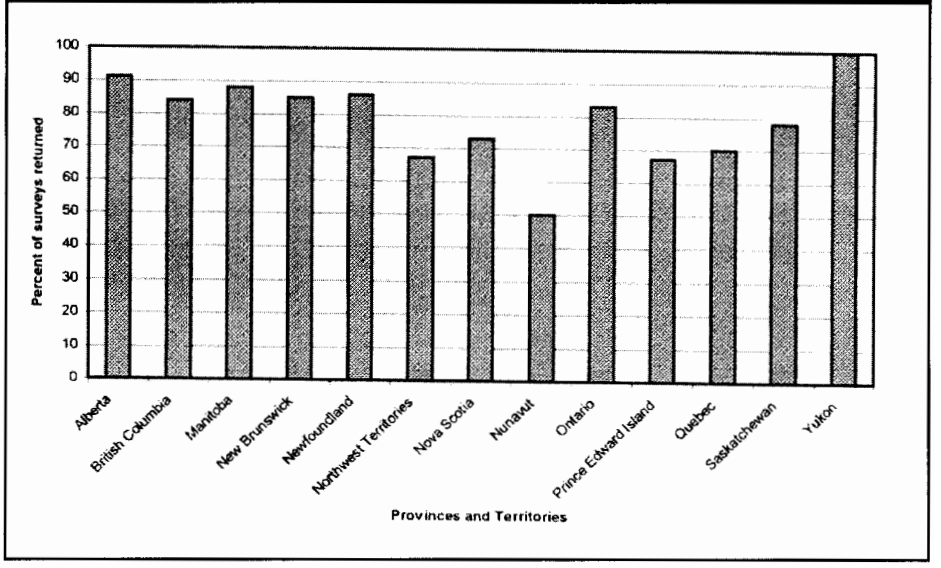
In 1981 the Department of National Health and Welfare Canada established a Task Force in response to a request from the Canadian Advisory Coalition on Childhood Hearing Impairment. The Task Force published a report (Minister of National Health and Welfare, 1984) in which 26 recommendations were formulated. Some of which were as follows: (a) children at risk for hearing loss should be screened in infancy; (b) provinces should work toward a centralized computerized tracking system to ensure adequate follow-up; (c) comprehensive diagnostic services should be made available; and, (d) habilitation and education should commence at the time of diagnosis.

The purpose of the current study was to determine the state of UNHS programs within Canada and to determine if the above four cited recommendations of the Task Force report on childhood hearing impairment (Minister of National Health and Welfare, 1984) were met. The Canadian Newborn Hearing Screening Survey was used to determine the number of facilities in Canada currently conducting or considering universal hearing screening as a standard of care in their facility.

Methods

The Canadian Newborn Hearing Screening Survey questionnaire was used to evaluate the state of hearing screening programs in Canada (see Appendix). The survey tool used in this project was a modified version of a survey developed by the Marion Downs National Center for Infant Hearing (Arehart, Yoshinaga-Itano, Thomson, Gabbard, & Brown, 1998) and was used with permission. The questionnaire was sent in 1999 to all birthing hospitals[1] identified in Canada (N = 467). The questionnaire included information regarding demographics of birthing centres, average length of newborn stay in these centres, nature of the site's hearing screening program, and the number of babies screened.

Figure 1. Percent of Canadian Newborn Hearing Screening Surveys Returned as a Function of Province.



Results

Birthing Centres in Canada

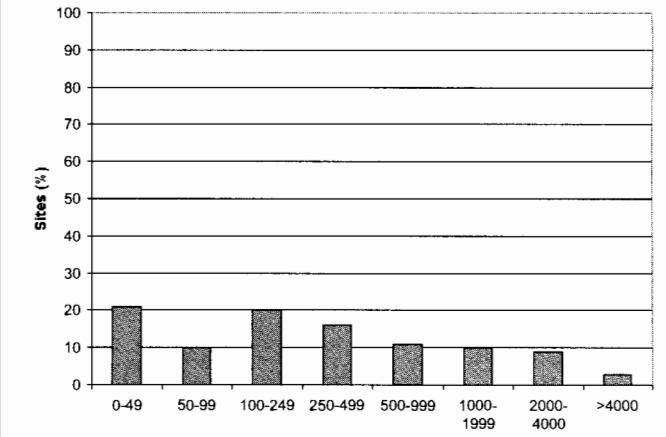
Of the 467 hospitals across Canada that were sent the Canadian Newborn Hearing Screening Survey, 384 responded (i.e., an 82% return rate). Surveys were received from all prov-

Table 1. Number of Birthing Hospitals as a Function of Geographical Location and Province.

	Geographical Location				Row Total
Province	**Rural**	**Urban**	**Frontier**	**Other**	
Alberta	55	8	1	0	64
British Columbia	41	9	0	3	53
Manitoba	24	2	0	2	28
New Brunswick	5	4	0	1	10
Newfoundland	8	1	2	0	11
Northwest Territories	2	0	0	0	2
Nova Scotia	10	1	0	0	11
Nunavut	0	0	1	0	1
Ontario	60	31	0	2	93
Prince Edward Island	1	0	0	1	2
Quebec	25	18	1	5	49
Saskatchewan	27	3	0	0	30
Yukon	2	0	0	0	2
Column Total	260	77	5	14	356

Note. *The geographic location refers to the population of the facility. Rural refers to a community with a population of <100,000, an urban centre has a population of > 100,000 people, and a Frontier has a population of <6 people per square mile.*

Figure 2. The Annual Birthing Census in Canadian Hospitals (n = 356).



inces and territories (see Figure 1), and the return rate ranged from a low of 50% in Nunavut to a high of 100% in Yukon.

Across Canada, 356 hospitals indicated that they had deliveries in 1998. The number of hospitals in each province was variable and their distribution is shown in Table 1. In addition, the geographic location of hospitals indicated that 73% (n = 260) were situated in rural areas, 30% (n = 77) in urban centres, 1% (n = 5) in frontier regions and 4% (n = 14) are other locations.

Statistics Canada reported that 340,891 infants were born in Canada during 1998.[2] The 356 birthing centres that responded had an annual birthing census of 264,363 which represented 78% of the total annual census in Canada. A comparison of the provincial birthing census and the hospitals that returned the survey indicated that there is a good representation of the population in each of the provinces. Table 2 shows that the majority of babies are born in urban hospitals. The majority of birthing hospitals in Canada (67%) had less than 500 births per year with 21% of those hospitals having less than 50 births per year (see Figure 2). This is consistent with the notion that a large number of hospitals deliver a small number of babies.

Within Canadian hospitals, 62% had Level I nurseries, 25% Level II facilities and only 13% Level III nurseries. The average length of stay in the hospital for infants who were vaginally delivered is shown in Figure 3. The length of stay did not change with geographic location - mothers tend to

Figure 3. The Distribution of the Average Length of Stay in Hospital After an Uncomplicated Vaginal Delivery as a Function of Time (in Hours) and Geographical Location.

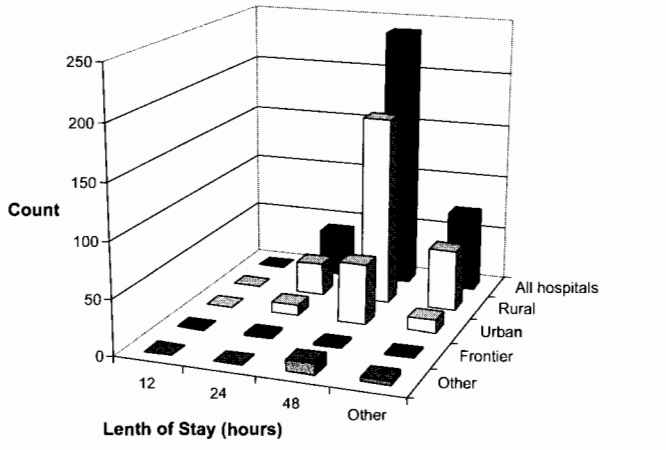


Table 3. Number of Hearing Screening Programs and Number of Infants Born in Those Facilities as a Function of Geographical Location and Province in 1998 as Revealed by the Canadian Newborn Hearing Screening Survey.

	No. of Programs	Geographical Location				No. of Births
Province		Rural	Urban	Frontier	Other	
Alberta	2	0	2	0	0	8934
British Columbia	4	2	2	0	0	6969
Manitoba	1	0	1	0	0	4200
New Brunswick	4	2	2	0	0	5073
Newfoundland	2	1	1	0	0	2820
Northwest Territories	1	1	0	0	0	650
Nova Scotia	8	7	1	0	0	7645
Nunavut	0	0	0	0	0	0
Ontario	7	2	5	0	0	16927
Prince Edward Island	1	1	0	0	0	489
Quebec	4	2	2	0	0	8592
Saskatchewan	1	0	1	0	0	3093
Yukon	0	0	0	0	0	0
Total	35 (10%)	18	17	0	0	65392 (25%)

Note. *The geographic location refers to the population of the facility. Rural refers to a community with a population of <100,000, an urban centre has a population of > 100,000 people, and a Frontier has a population of <6 people per square mile.*

stay in the hospital for 48 hours independent of whether they are situated in an urban, rural, or frontier area.

Screening Programs

Approximately 10% (n = 35) of Canadian hospitals which reported deliveries had a newborn hearing screening program of any type. The 35 centres that had hearing screening programs accounted for 25% of the infants born in Canada. Table 3 shows that only 65,392 infants had an opportunity to participate in a hearing screening program and many of these only participated in a high-risk registry. The absence of a screening program was reported by approximately 90% (n = 321) of the birthing centres. Therefore 198,971 infants born in 1998 did not have their hearing screened.

Of the 35 screening programs in Canada, 51% (n = 18) were in rural locations and 43% (n = 17) were in urban hospitals. With the exception of Nunavut and the Yukon, at least one hearing screening program was reported in all provinces and the Northwest Territories. Only 23% of birthing hospitals had an audiologist on staff and most of these were in urban centres.

Types of Screening Programs

Most centres with screening programs used either a high-risk registry (HRR) or confined screening to a defined target population within the hospital (i.e., NICU). Other centres used varying approaches to screening newborns as shown in Figure 4. The HRR programs were found in British Columbia (n = 3), New Brunswick (n = 3), Newfoundland (n = 2), Nova Scotia (n = 7), Ontario (n = 2), and Quebec (n = 1). There were six UNHS programs in Canada: the Northwest Territories (n = 1), Ontario (n = 3) and Quebec (n = 2).

Personnel Performing Screening Procedures

The results from this survey indicated that 71% of screening programs utilized audiologists, 57% used nursing staff, 26% had technicians, 9% were done by volunteers and 14% incorporated other personnel.

Technology and Data Management

Physiological screening protocols used were either OAE or ABR. As shown in Figure 5, the use of the two technologies in physiological newborn hearing screening was evenly split. Thirty-eight percent of the centres used standard ABR while 9% used automated ABR. The majority of centres that used OAEs employed distortion product otoacoustic emissions

Figure 4. The number of sites reporting screening programs as a function of program type including HRR (either for all infants or for NICU infants), screening infants at risk or those in the NICU using a physiologic measure (Physio High), universal newborn hearing screening programs using a physiologic measure (Physio All) or using a Noisestik (Noise All). Note. Some centres use multiple approaches.

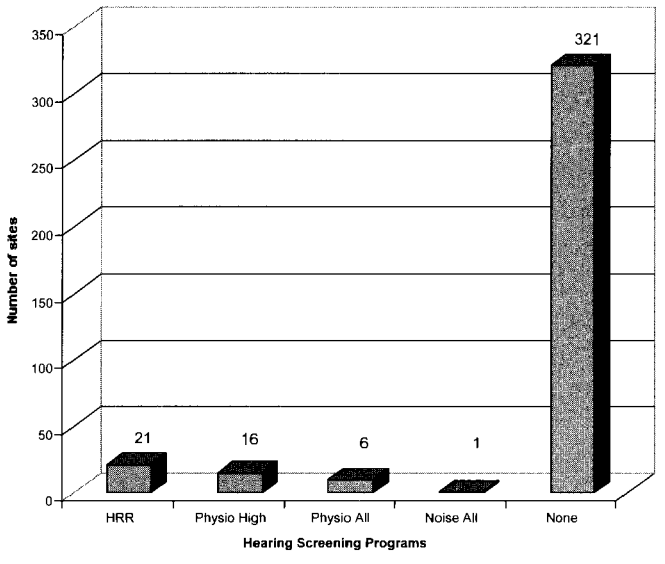
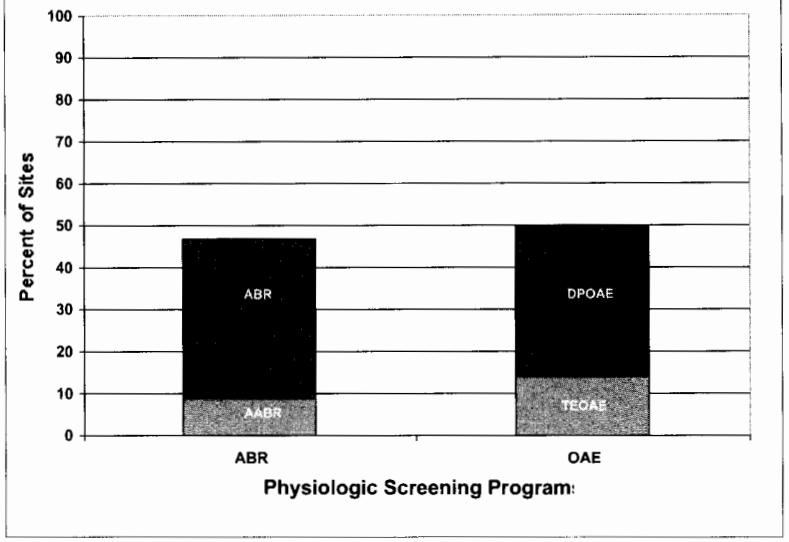


Figure 5. Different types of technology used in physiologic screening programs.



(DPOAEs) as the test of choice (see Figure 5).

Fifty-four percent of all newborn hearing screening sites (n = 35) used a manual data management system, 31 % used a computer based computer data management system, 11% used some other method while 3% had no data management system at all. Of the computer based data management systems, 61% had developed their own system and the other thirty-nine percent used one of the systems specifically designed for hearing screening (e.g., Oz system, Natus, or Biologic).

Consent for screening

Many hospital procedures require patients (or surrogate) to give consent. Hearing screening, although non-invasive, may require the parent or legal guardian to give informed consent. The survey results indicate that of the screening programs that responded (n = 31), 19% indicated that consent was required in either a written or verbal form at their centre. The remainder indicated that consent was implied or that no consent was required for the procedure. Written information was given to the parent by 16% of programs and verbal information was given to the parents by 25% of the programs (n = 31). The screening test was a part of routine care or as a standing order from all physicians in 58% of screening programs (n = 26). In 42% of sites, screening was not a uniform standing order.

Results of the screening test and referrals for further testing

The results of screening need to be communicated to parents. The most common person to communicate this information to the parent was the audiologist (51%), followed by the screener (43%), and then the physician (31%). The information was most often presented either verbally (34%) or in written form (26%) before discharge. In addition, a small percentage of sites reported that the information was shared after discharge by phone or mail and only one site reported that the information was not shared with the parents.

UNHS programs are designed to test all newborns however; some will fail and require further testing. Some of these will be true failures and others will be false positives. If the number of failures is too high, it will put undue stress on the diagnostic centres because they will have to test more infants than necessary. Of the six UNHS programs, only three reported their referral rate. One of these programs reported a less than 1% referral rate, the next reported between 6 and 10% referral rate and the last reported between 11 and 15%.

Discussion

The Canadian Newborn Hearing Screening Survey found that there were only 35 hearing screening programs in Canada in 1998. This indicates that the number of centres that offered newborn hearing screening was low (10%). Of those that do not have a screening program, 53% (n = 147) were interested in having a program in their centre. Anecdotally, a number of regions or hospitals indicated that they were in the process, albeit in the initial stages, of developing a UNHS program at their centre. In addition, Alberta and Ontario have recently announced that they will be developing a provincial program, so the interest in UNHS seems to be increasing.

Most provinces had at least one hearing screening program with the exception of Nunavut and Yukon. Just over half of the 35 screening programs were situated in rural areas (51%) and the remainder is in urban centres (49%). It is not surprising that there were more screening programs in rural centres than in other settings given that 73% of Canadian hospitals were in rural areas. However, more babies were born in urban centres where there were fewer screening programs. This may explain the low number of newborns that were screened. In addition, screening programs in Canada face a difficult challenge. With the majority of hospitals having less than 500 births per year and 21% having less than 50 births per year, establishment of programs becomes difficult to establish or justify. Training staff or purchasing equipment to test one infant per month will require different solutions or methods than those currently in use.

The hearing screening programs reported in this survey used mainly HRRs (54%). Previous studies reveal that approximately 50% of newborns with hearing loss do not have any of the high risk factors (NIH, 1993). Therefore half of the hearing impaired newborns will be missed using an HRR approach. Other programs only test infants found in the NICU, again this type of screening program will miss all newborns with hearing loss born in the well-baby nursery.

In 1984, the Task Force that was established by the Department of National Health and Welfare Canada (Minister of National Health and Welfare, 1984) recommended guidelines for Newborn Hearing Screening in Canada. The current study, some 15 years later, was able to assess the implementation of some of these recommendations. It confirmed that very little progress has been made towards meeting these recommendations. With only 35 hearing screening programs in Canada, there is long road ahead in order to meet the recommendation that children at risk for hearing loss should be screened in infancy. With respect to follow-up of infants in whom normal hearing was not confirmed, no centralized computerized tracking system has been developed, therefore adequate follow-up has not been ensured. Diagnostic services are available but given the number of hospitals that could be conducting hearing screening, more pediatric audiology facilities may become necessary.

In conclusion, this survey accounted for 264,363 infants born in Canada in a one year period. Only 25% were born in hospitals with screening programs and many of those do not screen all newborns. Each year close to 200,000 infants do not have hearing screening done prior to discharge from the hospital. Hence with a prevalence rate for hearing loss of 6/1000 infants, there can be up to approximately 1200 hearing impaired infants undetected until after six months of age, the critical time according to Yoshinaga-Itano and colleagues (Yoshinaga-Itano et al., 1998). With the recommendation that all infants are identified before three months and intervention initiated by six months, UNHS in Canada is still in its infancy.

Endnotes

1. The questionnaire in this study was only sent to birthing hospitals and therefore could have missed some NICU screening programs in paediatric hospitals.

2. Births and birth rate were acquired from the Statistics Canada (2000) website: www.statcan.ca/english/pgdb/people/population/demo04ass.htm.

Author Notes

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APPENDIX

Canadian Newborn Hearing Screening Survey

SECTION I. Demographic Information (to be completed by all hospitals)

1. Hospital/Birthing Centre: _____
Contact Person: _____
Title of Contact Person: _____
Address: _____
City: _____ Province: _____ Postal Code: _____
Phone Number, including area code: (____) _____ extension _____
Fax Number, including area code: (____) _____
Email Address: _____

2. Are babies born at your hospital/centre?

__ Yes
__ No (If there are no births at your facility, please stop and send survey to the address listed above.)

3. How many babies were born in 1998?

_____ babies were born in your facility in 1998.

4. What is the geographic location of your hospital?

__ Rural (community served has population less than 100,000)
__ Urban (community served has population more than 100,000)
__ Frontier (community served has population < 6 people/square mile)
__ Other, please describe_____

5. What types of nurseries are available in your hospital/centre? How many beds in each?

__ Level I (well-baby care) ____ # of beds
__ Level II (Special Care Nursery) ____ # of beds
__ Level III (NICU) ____ # of beds

6. What is the average length of stay for infants who were delivered vaginally? (Check one)

__ 12 hours
__ 24 hours
__ 48 hours
__ Other, please describe_____

8. Does your hospital have an audiologist on staff?

__ Yes
__ No

9. Does your hospital have a newborn hearing screening program?

__ Yes. Please continue to Section II, question #11.
__ No. Please complete question #10.

10. If your hospital does not currently have a newborn hearing screening program, are you interested in starting a newborn hearing screening program?

__ Yes (If your hospital does not currently have a screening program, do not continue on to section II. Send survey to address listed on page 1.)
__ No

SECTION II. Birthing Centres with Newborn Hearing Screening Programs

11. Manager of the Newborn Hearing Screening Program

__ Same as contact person listed in question #1, page 1.
Name of Manager: _____
Title of Manager: _____
Address: _____
City: _____ Province: _____ Postal Code: _____
Phone Number, including area code: (____) _____ extension _____
Fax Number, including area code: (____) _____
Email Address: _____

12. Audiologist on staff of hospital and/or affiliated with Newborn Hearing Screening Program

__ No audiologist is on staff or affiliated with our program.
__ Same as person listed in question #1, page 1.
__ Same as manager of newborn hearing screening program.
Name of Audiologist: _____
Title of Audiologist : _____
Address: _____
City: _____ Province: _____ Postal Code: _____
Phone Number, including area code: (____) _____ extension _____
Fax Number, including area code: (____) _____
Email Address: _____

Please note the abbreviations used in the remainder of this survey:

OAE:	Otoacoustic Emissions
TEOAE:	Transient Evoked Otoacoustic Emissions
DPOAE:	Distortion Product Otoacoustic Emissions
AABR:	Automated Auditory Brainstem Response
ABR:	Auditory Brainstem Response

13. What methods of newborn hearing screening does your hospital/centre use before discharge? Check all that apply.

__ Screening deferred to outpatient setting.
__ High Risk Register using a questionnaire on all infants before discharge
__ High Risk Register using a questionnaire on NICU infants only before discharge
__ Screen all infants before discharge using physiological test (ABR, AABR, and/or OAE)
__ Screen only infants with high risk factors before discharge with physiological test (ABR, AABR, and/or OAE).
__ Screen NICU infants only with physiologic test (ABR, AABR, and/or OAE) before discharge
__ Noisestik, noisemakers and/or warblet on all infants before discharge
__ Noisestik, noisemakers and/or warblet on NICU only before discharge
__ Noisestik, noisemakers and/or warblet on HRR only before discharge

14. If you screen using a physiologic-based technology, which procedure(s) do you use on all babies you screen? Check all that apply.

__ OAEs Indicate type(s) of OAEs used: _____ TEOAE ____ DPOAE
__ AABR
__ ABR
__ Other, please specify_____

15. What personnel does your hospital use for screening? Check all that apply.

__ Nurses
__ Technicians
__ Volunteers
__ Audiologists
__ Other, please specify _____

16. How is consent for screening obtained from parents? Check all that apply.

__ Consent is implied as part of routine neonatal admission
__ Written information provided for parent but no specific consent is obtained.
__ Verbal information is provided for parent but no specific consent is obtained.
__ Verbal permission is obtained.
__ Written permission is obtained.

17. Check all of the following that apply to your screening program:

__ Screening is a standing order from all physicians
__ Screening is not a uniform standing order: some physicians order screening for some babies.

18. How are parents informed about a "pass" result from the screening? Please check all that apply.

__ Screening personnel inform parents.
__ Physician informs parents.
__ Audiologist informs parents.
__ Parents are informed by mail.
__ Parents are informed by phone call.
__ Parents are informed verbally before hospital discharge.
__ Parents are informed through written material before hospital discharge.
__ Parents are not informed of a test "pass" result.

19. How are parents informed about a referral? Please check all that apply.

__ Screening personnel inform parents.
__ Physician informs parents.
__ Audiologist informs parents.
__ Parents are informed by mail.
__ Parents are informed by phone call.
__ Parents are informed verbally before hospital discharge.
__ Parents are informed through written material before hospital discharge
__ Parents are not informed about a referral.

20. When an infant does not have a normal screening test, do you recommend the baby return for an outpatient re-screen?

__ Yes. Please complete questions 21 and 22.
__ No. Please go to question 23.

21. What technology do you use to re-screen? Check all that apply.

__ ABR
__ AABR
__ DPOAE
__ TEOAE

22. What personnel does your hospital use for outpatient re-screening? Please check all that apply.

__ Nurses
__ Technicians
__ Volunteers
__ Audiologists
__ Other, please describe_____

23. What type of hospital based data management system(s) do you use? Check all that apply.

__ We use a manual data management system.
__ We use a computerized system developed for use by our site.
__ We use the Databook (Natus) computerized system.
__ We use the Hi Track (NCHAM) computerized system.
__ We use the Oz computerized system.
__ We use the Biologic computerized system.
__ Other, please specify_____

24. To which of the following individuals/agencies do you report screening results? Check all that apply.

__ Parents
__ Primary Care Physicians
__ Provincial Health Department
__ Provincial Department of Education
__ Early Intervention Services
__ Other, please describe_____

25. Who refers the family for a diagnostic evaluation, if needed, following the "screening" process? Check all that apply.

__ Nursery Staff
__ Physician
__ Audiologist
__ Coordinator of Newborn Hearing Screening Program
__ Other, please describe_____

26. Who is responsible for assuring that an infant who is referred from screening receives a diagnostic evaluation? Check all that apply.

__ Nursery Staff
__ Physician
__ Audiologist
__ Coordinator of Newborn Hearing Screening Program
__ Other, please describe_____

27. How do you identify/ monitor infants at risk for progressive hearing loss? Please check all that apply.

__ We do not identify infants at risk for progressive hearing loss.

__ High risk indicators established by the Joint Committee on Infant Hearing
__ Provide parents with information regarding progressive hearing loss
__ Refer for audiological monitoring
__ Other, please describe_____

28. For babies referred from screening, what information do you provide families regarding their options for obtaining diagnostic audiological services? Check all that apply.

__ No specific information is given regarding diagnostic audiological services.
__ Family is informed about audiologic services available within our hospital.
__ Family is given a referral list consisting of all audiologists in the community.
__ Family is given a referral list consisting of a subset of audiologists in the community.
__ Family is given information about Public Health/Provincial supported audiology services.
__ Other, please describe_____

29. Who monitors the outcomes of diagnostic referrals? Please check all that apply.

__ Outcomes are not monitored at this time
__ Outcomes are monitored by a Provincial Health Department tracking system
__ Outcomes are monitored by a hospital-based system.
__ Outcomes are monitored by a community/regional tracking system
__ Outcomes are monitored by an audiologist.

30. Please check all of the following that apply to outside funding used to support your program.

__ We do not receive outside funding.
__ We receive outside funding from service organizations.
__ We receive outside funding from hospital auxiliaries.
__ We receive outside funding from the Provincial Health Department.
__ Other:_____

31. If you have a universal newborn hearing screening program, what percentage of infants are referred for further testing at the time they are discharged from the hospital?

__ 1% or less
__ 2%
__ 3%
__ 4%
__ 5%
__ between 6% and 10%
__ between 11% and 15%
__ between 16% and 20%
__ greater than 20%