

Community education on preterm birth

Does it change practice?

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ABSTRACT

OBJECTIVE To evaluate how well physicians and other prenatal care providers educate women about early recognition of and appropriate response to the signs and symptoms of preterm labour (PTL). To assess use of antenatal steroids for babies born at less than 34 weeks' gestation.

DESIGN Before-after study using a population-based approach.

SETTING Health care providers' offices, hospitals, and prenatal classes in Ottawa, Ont.

PARTICIPANTS Prenatal care providers, women in hospital after giving birth, prenatal class participants.

INTERVENTIONS Prenatal care providers received information and educational materials on PTL and preterm birth (PTB). They passed this information on to pregnant women at their 18- to 20-week prenatal visits. Teachers of prenatal classes gave the same information in early-series classes. Clinical practice guidelines were developed, and hospital staff received education on appropriate response to PTL.

MAIN OUTCOME MEASURES Use of educational materials and steroid treatment.

RESULTS Statistically significant increases were seen in the numbers of care providers who had educational material about PTL and PTB, who reported giving the educational material to all women, and who reported discussing signs and symptoms of PTL and PTB with all women; women who reported that their care providers talked with them about PTL and PTB, and women delivering preterm (<34 weeks) babies who received steroids.

CONCLUSION Providing knowledge and standardized educational materials to health care providers can help improve preventive practice for PTL and educate women about PTL.

RÉSUMÉ

OBJECTIF Évaluer la mesure dans laquelle les médecins et les autres dispensateurs de soins prénatals éduquent les femmes concernant la reconnaissance précoce des signes et des symptômes du travail prématuré et la réaction appropriée à ce phénomène. Évaluer le recours aux stéroïdes prénatals pour les enfants nés à moins de 34 semaines de gestation.

CONCEPTION Une étude avant-après à l'aide d'une approche fondée sur la population.

CONTEXTE Les cabinets de dispensateurs de soins, les hôpitaux et les classes prénatales à Ottawa, en Ontario.

PARTICIPANTS Les dispensateurs de soins prénatals, les femmes à l'hôpital après l'accouchement, les participants aux cours prénatals.

INTERVENTIONS Les dispensateurs de soins prénatals ont reçu de l'information et du matériel éducatif sur le travail prématuré et sur les naissances prématurées. Ils ont transmis cette information aux femmes enceintes, à leur visite prénatale après de 18 à 20 semaines de gestation. Les enseignants des cours prénatals ont donné ces mêmes renseignements durant les premières séances. Des guides de pratique clinique ont été élaborés et le personnel des hôpitaux a reçu de la formation concernant la réaction appropriée au travail prématuré.

PRINCIPALES MESURES DES RÉSULTATS Le recours au matériel éducatif et au traitement aux stéroïdes.

RÉSULTATS Des hausses significatives sur le plan statistique ont été observées dans le nombre de dispensateurs ayant du matériel éducatif sur le travail et l'accouchement prématurés qui ont signalé l'avoir transmis à toutes les femmes et avoir discuté des signes et des symptômes du travail et de l'accouchement prématurés avec toutes les femmes; dans le nombre de femmes qui ont rapporté que leur dispensateur de soins en avait discuté avec elles; et dans le nombre de femmes qui ont accouché avant terme (<34 semaines) dont les nouveau-nés ont reçu des stéroïdes.

CONCLUSION Le fait d'accroître les connaissances et de diffuser du matériel éducatif normalisé aux dispensateurs de soins peut aider à améliorer les pratiques de prévention du travail prématuré et à éduquer les femmes à ce sujet.

This article has been peer reviewed.

Cet article a fait l'objet d'une évaluation externe.

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Preterm birth (PTB) is one of the most pressing problems in perinatal care today. It is the most frequent complication of pregnancy¹ and accounts for the most neonatal morbidity and mortality.^{2,4} The best ways to prevent and treat PTB are still largely unknown, probably because PTB has many risk factors and because we are uncertain about its underlying causal mechanisms. Also, PTB affects many people and is not restricted to an easily identifiable group.

Over the years, various preventive strategies, such as risk scoring, intensive education, frequent prenatal visits, psychosocial support, home uterine monitoring, tocolysis, and combinations of these have been tested in various high-risk populations.¹ Meta-analyses of the randomized controlled trials of PTB prevention programs for high-risk populations showed the programs had little effect in reducing PTB.^{2,5} Consequently, we need to develop and evaluate new approaches to prevention.

Until the causes of preterm labour (PTL) are better determined and primary prevention models established, one of the more promising avenues for reducing the morbidity and mortality associated with PTB involves promoting early detection and appropriate response to PTL.^{1,6,8} Prompt recognition of the signs and symptoms of PTL (secondary prevention) is essential if treatment with corticosteroids (tertiary prevention) is to begin early enough for the best effect.

One full course of corticosteroids (two doses 24 hours apart) given to a mother antenatally is the one intervention known to make a difference in neonatal morbidity and mortality for infants of 24 to 34 weeks' gestation.^{4,9} Sinclair¹⁰ calculated the number needed to treat (NNT) to reduce respiratory distress syndrome and neonatal death on the basis of data from four trials that stratified results by gestational age. The NNT to prevent one case of respiratory distress syndrome was four at <31 weeks, 15 at 31 to 34 weeks, and 145 at >34 weeks. Sinclair¹⁰ calculated that 22 fetuses would need to be exposed to corticosteroids to prevent one neonatal death.

Keirse³ emphasized that early and accurate detection of PTL is very important for allowing time for

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lung maturation and for arranging for birth to take place in an appropriate facility. An essential part of the strategy for early recognition of PTL is to educate all women on how to recognize and respond to its signs and symptoms. Educating all women, not just those considered at high risk, is important because most PTBs occur in low-risk populations.⁸ Davies et al¹¹ found that many physicians and midwives did not talk to women about PTL or PTB, and when they did, the information they gave was inconsistent and not entirely evidence based. In 1995, a large survey of hospitalized postpartum women had similar findings.¹²

This paper reports on a community-wide education program on PTL and PTB called "REACH, REACT, RESPOND" that took place in Ottawa, Ont. The primary objective was to assess whether the educational intervention would change health care professionals' behaviour in regard to counseling women about PTL and PTB and women's knowledge about PTL and PTB. A secondary outcome evaluated was whether the proportion of babies born at <34 weeks' gestation who received a full course of antenatal steroids increased.

METHODS

Setting

In the early 1990s, the Ottawa-Carleton region formed a community coalition of hospital and public health workers, women and men directly affected by PTB, business people, primary health care providers, and others interested in PTB. Using focus groups to comment on the program as it was developed, the community coalition came up with an educational intervention called REACH, REACT, RESPOND.

Intervention

The goals of the REACH, REACT, RESPOND program were to encourage health care providers to educate women and their families about the signs and symptoms of PTL, how to respond, and how to seek appropriate treatment. Another goal was to increase use of antenatal steroids for women in PTL who were likely to deliver at <34 weeks' gestation. Standardized pamphlets and posters were produced and tested in focus groups, and evidence-based clinical practice guidelines were developed to encourage consistent and appropriate response to PTL and PTB.

REACH aimed to ensure that every pregnant woman between 18 and 22 weeks' gestation learned about the signs and symptoms of PTL and PTB from

Table 1. Signs and symptoms of preterm labour

A sudden gush of fluid or a constant slow leak of fluid from your vagina (“down below”)

Bleeding from your vagina

Contractions or tightenings of the uterus that might be painless

OR a change in what you normally feel in:

- low dull backache
- pelvic pressure (feeling full or heavy)
- discharge from the vagina

Data from Perinatal Partnership Program of Eastern and Southeastern Ontario.¹³

her health care provider. **Table 1** outlines the signs and symptoms of PTL mentioned in the booklet *Be Prepared for the Unexpected—Preterm Labour. It Can Happen to You*.¹³ REACT was the message to women and their care providers. If any of the signs and symptoms of PTL occurred, the message was, “Go to the hospital.” The aim was to prevent the delay associated with telephone calls and to discourage physicians from diagnosing PTL over the telephone. RESPOND was aimed at ensuring that health care providers, hospital staff, and women and their families knew what an adequate and timely response to the signs and symptoms of PTL was.

The education program was given in a community prenatal care setting. More than 95% of women in the region start prenatal care at ≤13 weeks’ gestation.¹² Therefore, most women were educated on the signs and symptoms of PTL during routine prenatal care.

Participants

All prenatal physicians and midwives were offered an office visit for themselves and their staff from one of two registered nurses. In advance of the visit, health care providers were sent a letter signed by two well-known medical community members requesting their participation and an audiotape of a short counseling session on PTB. If those contacted chose to participate, an office visit was scheduled. During the visit, the nurse used standardized materials to talk about PTB in our region, to outline the REACH, REACT, RESPOND program, and to provide enough educational materials to last health care providers for 2 years. Care providers were asked to discuss PTL and PTB with every pregnant woman between 18 and 22 weeks’ gestation. A follow-up call to determine how physicians and midwives were doing with the program was made 1 month after the visit.

At the broader community level, prenatal teachers used the same standardized tools and information in their classes. As well, staff in the birthing and antepartum units and the obstetric clinics of the five local hospitals were told about the REACH, REACT, RESPOND program, the signs and symptoms of PTL being taught to pregnant women, and the current assessment and treatment protocols for PTL, including use of corticosteroids.

Evaluation methods

A three-point time-series study was used to evaluate the intervention: an assessment before the intervention (T1) and one or two more assessments after the intervention (T2 and T3) were carried out. Three data collection methods (health care provider survey, survey of postpartum women, and chart audit) were used to assess the effect of the educational intervention (**Table 2**).

Health care provider survey. This survey was done immediately before the intervention (T1) and 1 year after implementation (T2). All prenatal health care providers indicating they performed deliveries or shared obstetric care were eligible. The survey instrument designed by Davies et al¹¹ was used with the Dillman survey protocol.¹⁴ Main topic areas included current practice on counseling about PTL, availability of client information on PTL and PTB, and use of steroids and tocolytic drugs. All prenatal care providers working in the Ottawa-Carleton region were asked to participate in the survey.

Table 2. Study design, time lines, and sample sizes

YEAR	ASSESSMENT METHOD	N
1995–1998	Development of program and pilot testing	
1998 (T1)	Health care provider survey	173
	Patient survey	406
	Chart audit	88
1998	Education of health care providers and all pregnant women at 18-20 weeks’ gestation	
1999 (T2)	Repeat health care provider survey	147
	Repeat patient survey	411
	Repeat chart audit	112
2000 (T3)	Repeat patient survey	413
	Repeat chart audit	123

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Survey of women. Ethical approval was obtained from the participating hospitals for the patient survey and chart audit. A survey of hospitalized postpartum women, using an interviewer-administered questionnaire, was done immediately before implementation (T1) and 1 year (T2) and 2 years (T3) after implementation. The study sample was obtained from women who gave birth in one of the five Ottawa-Carleton hospitals during the month before the intervention. All women who spoke French or English and had given birth after 20 weeks' gestation were included. Some women consented to complete the questionnaire by telephone at home if there was insufficient time in hospital.

Questionnaires, which included open and closed questions and which were developed from a literature review and experience of the coinvestigators, were extensively pilot-tested in 1995.¹² Questionnaires sought information on general knowledge about PTL and PTB, women's information sources, women's experience with signs and symptoms of PTL, and demographic characteristics.

Chart audit. A trained reviewer conducted a chart audit on all babies born at 24 to 34 weeks' gestation at Ottawa-Carleton hospitals. Data were collected for babies born 4 months before the intervention and then at 8 to 12 and 20 to 24 months after the intervention. The reviewer looked for information on use and timing of antenatal steroids, gestation period, birth weight, maternal complications, and type of birth.

Statistical testing

Data were analyzed using SPSS for PCs, version 3.1. Descriptive statistics were used to respond to the objectives. The three time periods were compared using χ^2 analysis. Answers to open-ended questions were grouped into themes and reviewed.

Sample size

For the survey of women, the primary outcome was whether the program would change health care provider behaviour in regard to counseling about PTL and increase women's knowledge of PTL. Sample sizes (at least 400) in each time period were sufficient to detect a change of at least 10% (eg, 50% to 60%) with a *P* value of .05 and a power of 80%. A secondary outcome was a change in steroid use. About 100 preterm babies (T1 88, T2 112, T3 123) were included in the chart audit for steroid use. This sample size permitted detection of a minimum difference of about 20% (eg, 50% to 70%) with a *P* value of .05 and a power of 80%.¹⁵

RESULTS

Of the 299 potential practices identified for visits, 48 stated they no longer did obstetrics or shared care, seven had moved, and three had people on leave. Of the remaining 241 practices, 61.8% (149/251) accepted a visit from project staff and agreed to participate in the program. About 71% of the sites participating were family physicians' offices.

The response rate to the health care provider survey was similar in 1998 and 1999 at 62%. The survey of postpartum women had a response rate of 78% in 1998 and 86% in both 1999 and 2000. There were no significant differences in demographic characteristics (age, education, marital status) among the women surveyed in the three time periods.

The rate of preterm birth in the eastern and south-eastern region of Ontario in T1 was 7.9%; in T2 and T3, it was 8.6%.¹⁶

Health care providers' education of women

More health care providers reported talking to all pregnant women about the signs and symptoms of PTL after the intervention (T1 55.9% vs T2 77.9%, *P*.0001). The proportion of health care providers who said they did not discuss signs and symptoms of PTL with pregnant women dropped from 20.0% in T1 to 6.9% in T2 (*P*.0001). Similarly, more postpartum women in hospital reported that their health care providers had talked to them about PTL and PTB (T1 44.2%, T2 60.8%, T3 55.2%; *P*.00001).

Women's knowledge about PTL and PTB

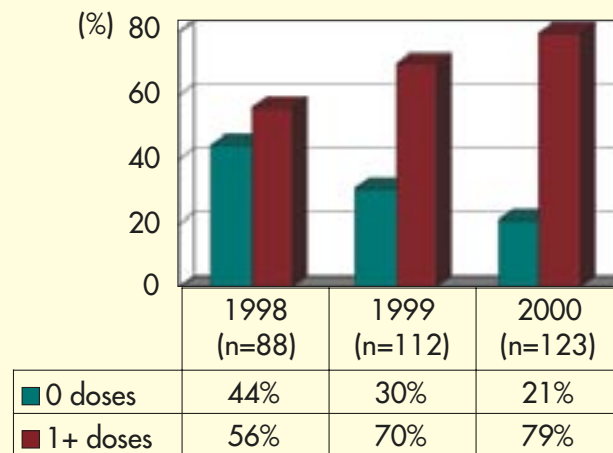
No increase in knowledge of signs and symptoms of PTL was found during the study, with one exception: immediately after the intervention (1998 to 1999), the proportion of women who did not know any signs and symptoms of PTL decreased from 12.1% to 6.1% (*P*.003). By 2000, however, this effect was lost: 14% of women were unable to recall any signs and symptoms of PTL.

There was no significant change over time in the proportion of women who reported they were told to go to hospital if they had signs and symptoms of PTL (T1 56.4%, T2 57.6%, T3 59.7%). Many women said they wanted to call someone before going to the hospital.

Use of antenatal steroids

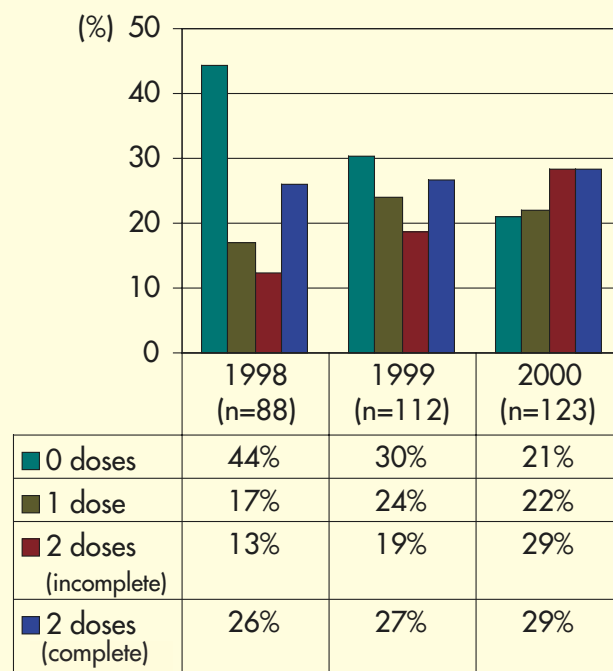
During the three study periods, an average of 70% of women who delivered preterm were admitted to hospital specifically for signs and symptoms of PTL. The other 30% were admitted for other maternal or fetal complications that led to preterm delivery. Multiple

Figure 1. Steroid administration to women who delivered preterm babies (24 to 34 weeks' gestation): $P = .002$.



STEROID ADMINISTRATION

Figure 2. Steroid administration to women who delivered preterm babies (24 to 34 weeks' gestation): $P = .01$



STEROID ADMINISTRATION

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gestation was a factor in 15% of women in T1, 21% in T2, and 26% in T3. A significantly higher proportion of pregnant women whose babies were born between 24 and 34 weeks' gestation received at least one dose of antenatal steroids during T2 and T3 than did during T1 ($P=0.002$). **Figures 1** and **2** show the sustained increase in use of steroids over time. No reports of a higher-than-normal number of visits to local hospitals, labour triage units, or doctors' offices were noted during the study period.

DISCUSSION

This project demonstrated the success of an educational strategy to increase preventive perinatal practice among health care providers. The educational materials were practical for clinicians and led to more women being educated about PTB.

Thomson and colleagues investigated the process of academic detailing or visiting health care providers' offices to communicate a particular message.¹⁷ They found that educational outreach visits, particularly when combined with social marketing, appear to lead to modification of professional behaviour, such as prescribing practices. They advocate for further research to assess their effectiveness on other aspects of practice and to identify key characteristics affecting success. Davis et al¹⁸ describe systematic practice-based interventions and outreach visits as more effective than other forms of continuing medical education, such as conferences.

Strong evidence indicates that adverse neonatal outcomes, the severity of complications, and costs associated with prematurity can be reduced by timely administration of antenatal corticosteroids.^{4,9} In our study, it is difficult to determine why the rate of antenatal steroid use improved over time. It might have been partly due to the release of clinical practice guidelines by professional associations endorsing use of corticosteroids in cases of suspected PTL.^{4,19} We know from Davis et al,¹⁸ however, that change in physician performance is more likely to occur after active rather than passive intervention (such as reading guidelines) and when a number of interventions are combined. Worrall et al²⁰ found that publication of guidelines in medical journals and mailing guidelines to practitioners had little effect on clinical practice. The Ontario College of Family Physicians now has a program of active intervention to help small groups promote use of guidelines to change practice.²¹

It is likely, therefore, that the change in practice occurred because it was part of a community-wide

program involving health care providers, patients, other prenatal education providers, and hospitals. It is also likely that educating health care providers led to increased awareness of the importance of steroid use in neonatal outcomes. The changes might be related to the increased availability and use of educational material and the interaction between health care providers and women on the subject of PTL and PTB.

Patterson et al²² found that women delayed seeking treatment for PTL because of "diagnostic confusion." In their study, women found it difficult to differentiate between physical symptoms common in pregnancy and those that indicated problems. Maloni²³ questions whether diagnostic confusion would be reduced by educating all women about the symptoms associated with PTB; this is what we attempted to do in our study. Moore and Comerford-Freda²⁴ support educating all pregnant women because, in most cases, it is impossible to predict PTL. They estimate that up to 50% of PTBs happen to low-risk women. It is important to make all women aware of the universal risk of PTL.

If PTB is the most pressing problem we have in perinatal care,²⁵ and we know that best practice at this point is to ensure timely diagnosis and treatment with corticosteroids to improve outcome, then it is the responsibility of all health care providers to inform women of the problem and help them develop a strategy for coping with it.

The idea of using population-based or community-wide education to promote action in the event of a health problem is not new. Stroke awareness and cardiac symptom awareness are two examples of programs that rely heavily on public and care provider education to initiate action. Alonzo and Reynolds,²⁶ in writing about acute myocardial infarction, state that effective intervention depends on knowledge (so that people can correctly label the symptoms), behaviour (so people know what to do when symptoms occur), and skills to cope with the emotional upheaval. Interventions with these components have been implemented in other communities trying to reduce their rates of PTB.^{4,7,27} While these studies were not randomized and were, therefore, subject to bias, the number of PTBs did decrease. Our study was different in that the end point was not a reduction in PTBs, but rather a change in knowledge leading to better outcomes for babies born preterm.

With time, there was a slight decrease in the proportion of women reporting that their health care providers talked to them about PTL and PTB. This is understandable because there was no additional reinforcement of education to health care providers after

the first intervention. More pamphlets were printed and were advertised in our regional perinatal newsletter, but health care providers had to call and request them, rather than a member of the project staff calling them to support their continuing efforts and to offer more supplies.

Limitations

A possible limitation of this study was that we had no way of knowing how the educational information given to health care providers was actually presented to women. We did have a standard protocol and counseling scenario laid out in the package provided. We did not find it practical, however, to monitor compliance because it was more important to evaluate the program's effectiveness in a "real world" situation. Another limitation of the study was collecting data from patients: interviewers relied on patient recall of an education session with a health care provider that happened, in many cases, weeks before the birth.

The ideal study design to answer our questions would have been a randomized controlled trial with one group of health care providers receiving the intervention and another not. This was not possible within a single community because of the high probability of contamination of the control group that would have occurred because prenatal care providers share on-call duties, see each other's patients, and practise in more than one location. Ideally, implementing the program in two or more similar communities would need to be evaluated. Our study does add important knowledge about ways to mobilize a community around an important health issue and about the role of health care providers in preventive health practices.

Conclusion

This study found that clinical practice in regard to educating women about PTL and PTB changed following academic detailing and provision of educational resources. In addition, more women delivering preterm babies at less than 34 weeks' gestation received a full course of steroids, and more received one or two doses. Continuing educational programs are necessary to maintain the effect of this intervention over time. Until effective primary prevention strategies are identified and applied, effective secondary and tertiary strategies will continue to be an important part of prevention. All health care providers who see pregnant women can contribute by discussing PTL, its risk factors, and its signs and symptoms, and by advising women to go to hospital immediately if such signs and symptoms occur. ❖

Editor's key points

- Successfully educating health care providers and pregnant woman about the signs and symptoms of preterm labour (PTL) is one important strategy to increase the chance of giving corticosteroids in time to reduce the incidence of respiratory distress syndrome and neonatal mortality.
- A community program was established to teach all women between 18 and 22 weeks' gestation the signs and symptoms of PTL, to encourage them to go directly to hospital when these symptoms occurred, and to increase caregivers' use of steroids.
- Health care providers received education through academic detailing; pregnant women received it at prenatal classes and from their own physicians or midwives.
- Although more caregivers discussed PTL with pregnant women, the women's general knowledge and behaviour did not change. Steroid use, however, was significantly increased following the intervention.

Points de repère du rédacteur

- Une éducation fructueuse des dispensateurs de soins et des femmes enceintes concernant les signes et les symptômes du travail prématuré représente une stratégie importante pour accroître les chances d'une administration opportune de corticostéroïdes pour réduire l'incidence du syndrome de détresse respiratoire et de la mortalité néonatale.
- Un programme communautaire a été mis sur pied pour enseigner à toutes les femmes dont la gestation se situait entre 18 et 22 semaines les signes et les symptômes du travail prématuré, pour les inciter à se présenter directement à l'hôpital lorsque ces symptômes se produisaient et pour augmenter le recours aux stéroïdes par les dispensateurs de soins.
- Les dispensateurs de soins de santé ont reçu leur éducation par l'entremise des milieux universitaires; les femmes enceintes l'ont reçue durant les cours prénatals et de leur propre médecin ou sage-femme.
- Même si un plus grand nombre de dispensateurs de soins ont discuté du travail prématuré avec les femmes enceintes, les connaissances générales et le comportement des femmes n'ont pas changé. Par ailleurs, le recours aux stéroïdes a augmenté de manière significative à la suite de l'intervention.

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Contributors

All the authors made substantial contributions to design and development of the project and participated in revising the manuscript. Ms Sprague coordinated the project and prepared the first draft of the manuscript. Dr Stewart designed the plan for data analysis and reviewed the data.

Competing interests

None declared

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