

# Facilitated “Fast Track” Referral Reduces Time from Abnormal Screening Mammogram to Diagnosis

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## ABSTRACT

**Background:** The Screening Mammography Program of British Columbia (SMPBC) implemented voluntary, facilitated referral to diagnostic imaging (“Fast Track”) after testing 5 interventions to reduce time from an abnormal screening mammogram to diagnosis. The purpose of this study was to compare time intervals for patients evaluated through the Fast Track process with patients who were not.

**Methods:** Data were extracted from the SMPBC database for women with abnormal screens conducted from January 1, 2003 to June 30, 2005 (N=40,292). After exclusions, 39,607 screens were analyzed. Median and 90<sup>th</sup> percentile times were calculated from abnormal screen to diagnosis and for three subintervals: abnormal screen to notification, notification to first assessment, and first assessment to diagnosis.

**Results:** One third of abnormal screens were investigated through Fast Track imaging facilities. Overall, the median time from abnormal screen to diagnosis was 8 days faster for Fast Track compared with non-Fast Track. There was no clinically significant difference in time from abnormal screen to notification. The median time from notification to first assessment was 1.1 weeks (Fast Track) compared with 2.4 weeks (non-Fast Track), a reduction of 9 days or 54% in the interval targeted by the Fast Track strategy. The time interval distribution from first assessment to diagnosis was significantly different only for those having a core biopsy (average 3 days faster for Fast Track).

**Interpretation:** Facilitated referral to diagnostic imaging reduces average time from notification of abnormal screen to first assessment by more than half. Additional strategies are needed to address diagnostic investigation beyond initial imaging procedures.

**Key words:** Mammography; breast neoplasms; diagnostic techniques and procedures; waiting lists; mass screening

*La traduction du résumé se trouve à la fin de l'article.*

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A breast screening program's responsibility does not end with screening.<sup>1</sup> Delays to diagnosis can lead to anxiety for the woman and her family.<sup>2,3</sup> In 1997, a Canadian Workshop on Organized Breast Cancer Screening identified delays in diagnostic assessment as an area of concern and proposed timeliness targets which were adopted in 1999.<sup>4,5</sup>

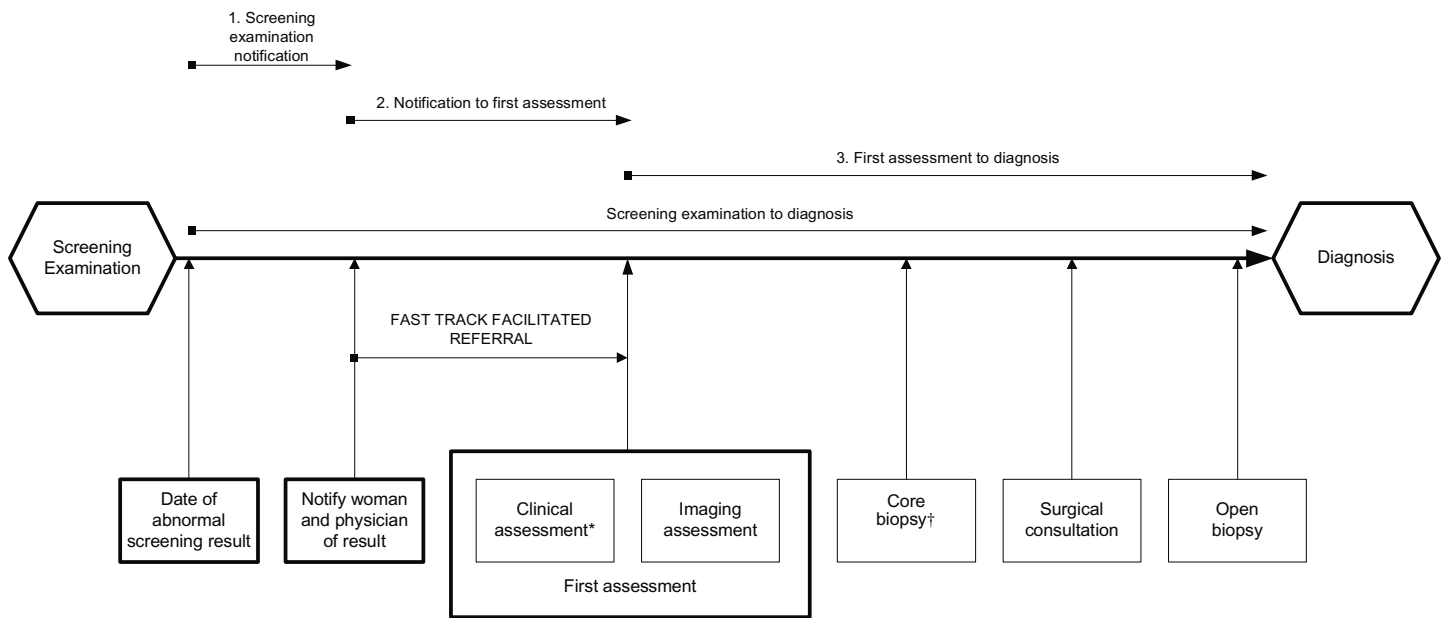
The Screening Mammography Program of British Columbia (SMPBC) is a population-based, breast screening program that provides BC women ages 40 to 79 years with bilateral, 2-view mammograms every 1 or 2 years, through 34 fixed centres and 3 mobile services. The mammograms are interpreted by 75 radiologists.<sup>6</sup> SMPBC program data have been published.<sup>7-10</sup> In some countries, assessment occurs within the screening program, but in most of Canada, diagnostic investigations are conducted through community diagnostic facilities according to clinical guidelines.<sup>11</sup> In 1995, the SMPBC led a provincial initiative to develop models for improving the process from abnormal screen to diagnosis.<sup>2,8</sup> In 1999, the SMPBC implemented the most promising model, direct referral to diagnostic imaging or “Fast Track”, which facilitates the diagnostic appointment without a visit to the family physician. This study was to determine how the Fast Track process affected the time from abnormal screen to diagnosis.

## METHODS

### Subjects

All abnormal screens conducted from January 1, 2003 to June 30, 2005 were extracted from the SMPBC database (N=40,292). We excluded 236 screens (0.6%) for women younger than 40 years or older than 79 years, and 449 screens (1.1%) with missing or invalid data, leaving 39,607 screens among 38,664 women for analysis.

Investigation through a Fast Track versus non-Fast Track facility is determined by whether the woman's family doctor has voluntarily joined the Fast Track Referral system. Women in the two groups (Fast Track and non-Fast Track) had a similar age distribution; their 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles were identical and were 46, 52, and 61 respectively. Data were not available on other participant factors.



**Figure 1.** Potential steps in the assessment of an abnormal breast cancer screening result. Not all steps are required to arrive at a diagnosis. [Intervals are not drawn to scale.] Bold boxes indicate the start and end points of assessment intervals studied.

\* May include physical breast examination, fine-needle aspiration or referral, or a combination.

† Depending on practice patterns, core biopsy may be performed before, after or without surgical consultation.

The study was approved by the University of British Columbia/BC Cancer Agency Research Ethics Board.

### Definitions of time intervals

The interval from abnormal screen to diagnosis was defined as the time in weeks between the date of the abnormal screening mammogram and the date of definitive diagnosis. The date of diagnosis was the procedure date of the first pathologic diagnosis of cancer, last benign biopsy, or last reported intervention with a recommendation to return to screening.

The interval from abnormal screen to notification was the time in weeks from the date of the abnormal screening mammogram to the date the notification letter was sent to the subject's family doctor (not the date it was received). The two other intervals, notification to first assessment and first assessment to diagnosis, were based on the date of the first assessment procedure (e.g., diagnostic mammogram, breast ultrasound, clinical exam).

### Fast Track procedure

In the pathway from abnormal screen to diagnosis, the first step is notification of an abnormality to the patient and her family physician (Figure 1). Fast Track affects the second step, where arrangements are made for diagnostic investigation. In the Fast

Track model, family doctors volunteer by filling out a one-page form and pre-selecting 2 participating diagnostic facilities.

When a woman arrives for her screening appointment, the screening centre clerk gives her an explanation of the Fast Track program and asks her to select the most convenient diagnostic centre. If further tests are necessary, the SMPBC films and the radiologist's recommendations are couriered to the selected diagnostic facility, and they contact the woman to book the follow-up tests. The family physician is mailed an interim report stating the screen result and the diagnostic facility to which the woman was referred. The diagnostic facilities aim to contact each woman and provide an appointment within one week of the abnormal screen, and they inform the family physician if the woman cannot be contacted. The diagnostic facilities reserve time slots so they can respond quickly to requests.

### Data collection and analysis

Information on screening outcomes was obtained from the SMPBC database, on breast-related procedures from the provincial Medical Services Plan, and on the detection of breast cancer from the BC Cancer Registry.

Median and 90<sup>th</sup> percentile values of each time interval were calculated after

stratifying for Fast Track facilitated referral. The Wilcoxon Mann-Whitney test was used to test for between-group differences in wait time distribution at the 0.05 level of significance.

## RESULTS

### Abnormal screen to diagnosis

During the study period, 2,957,961 screening mammograms were provided to 714,892 women and 40,292 abnormal screens were reported, of which 39,607 (98.3%) were included in the analysis. About one third of abnormal screens (13,278) were investigated through the Fast Track system. The median time from abnormal screen to diagnosis was 2.9 weeks in the Fast Track centres, compared with 4.1 weeks for patients not on Fast Track – a reduction of over 8 days (Table I).

### Abnormal screen to notification

The median time from abnormal screen to notification was less than 3 days and was similar for Fast Track and non-Fast Track. Ninety percent of screen reports were sent to women and their physicians within 1 week.

### Notification to first assessment by level of suspicion

The median time from notification to first assessment for Fast Track subjects was

TABLE I

Time (in Weeks) for Investigation after an Abnormal Screening Mammogram by Whether Investigated through the Fast Track Process

Assessment Interval	N	Fast Track		Non-Fast Track			Target*	p-value†
		50%	90%	N	50%	90%		
Abnormal screen to diagnosis	13,278	2.9	12.1	26,329	4.1	13.0	5.0 - 7.0	<0.01
Abnormal screen to notification	13,278	0.4	1.0	26,329	0.3	1.0	2.0	>0.10
Notification to first assessment	13,278	1.1	3.0	26,329	2.4	5.1	2.0	<0.01
Suspicion: Low	11,760	1.1	3.1	23,076	2.4	5.1		<0.01
Suspicion: Moderate	1251	1.1	3.0	2684	2.3	5.1		<0.01
Suspicion: High	241	0.9	2.1	555	1.1	3.6		<0.01
First assessment to diagnosis	13,278	0.0	9.6	26,329	0.0	8.9		<0.01
Biopsy	2000	5.3	14.6	3787	5.6	13.9	4.0	0.07
No biopsy	11,278	0	7.3	22,542	0	6.6	2.0	<0.001

\* National timeliness target in weeks for 90<sup>th</sup> percentile (Health Canada, 2000).

† p-value of Mann-Whitney test for difference between Fast Track and Non-Fast Track wait times.

TABLE II

Time (in Weeks) from First Assessment to Diagnosis for Subjects Who Had a Biopsy as Part of Assessment of an Abnormal Screening Mammogram

Assessment Interval	N	Fast Track		Non-Fast Track			p-value*
		50%	90%	N	50%	90%	
First assessment to diagnosis	2000	5.3	14.6	3787	5.6	13.9	0.07
Open biopsy	1205	6.0	15.1	2239	6.3	14.9	0.30
Cancer diagnosis	389	4.9	12.9	744	5.0	11.6	0.87
Benign diagnosis	816	6.9	15.9	1495	7.3	15.6	0.18
Core biopsy	795	3.7	13.0	1548	4.1	12.1	0.01
Cancer diagnosis	306	2.0	6.9	675	2.3	7.6	0.01
Benign diagnosis	489	5.0	14.6	873	6.0	13.9	0.02

\* p-value of Wilcoxon-Mann-Whitney test for time distribution, Fast Track vs. non-Fast Track.

1.1 weeks, compared with 2.4 weeks for non-Fast Track subjects. The 90<sup>th</sup> percentile time for Fast Track subjects was 3.0 weeks, compared with 5.1 weeks for non-Fast Track subjects. When evaluated through Fast Track facilities, women with high suspicion abnormal screens (2% of the abnormal screens) had slightly earlier appointments than those in moderate or low suspicion categories (median 0.9 weeks compared to 1.1 weeks). For high suspicion cases investigated through Fast Track facilities, 90% completed the interval from notification to first assessment in 2.1 weeks compared to 3.6 weeks for high suspicion screens in non-Fast Track facilities.

### First assessment to diagnosis

The median time from first assessment to diagnosis was less than 1 day for both groups because the majority of abnormal screens (57.4%) were clarified as non-cancer with a single assessment visit, usually on the basis of additional mammographic views and/or breast ultrasound. The interval from first assessment to diagnosis was evaluated separately for those who required only imaging and those who required biopsy. For subjects having imaging as the deterministic procedure, a larger proportion of non-Fast Track subjects completed assessment in a single visit (67.7% vs. 61.0%,  $p < 0.01$ ), however the

time from first assessment to diagnosis for subjects with multiple imaging procedures was not significantly different by Fast Track status ( $p = 0.12$ ).

Among women who went on to biopsy (Table II), 50% of those evaluated through Fast Track completed the interval from first assessment to diagnosis in 5.3 weeks, compared with 5.6 weeks for non-Fast Track ( $p = 0.07$ ). Women diagnosed with cancer were investigated more promptly than those with a benign diagnosis. For those with open biopsy, Fast Track median times from first assessment to diagnosis were 4.9 weeks for cancer diagnosis vs. 6.9 weeks for benign diagnosis, and non-Fast Track median times were 5.0 weeks vs. 7.3 weeks, respectively. Similar findings were seen in patients with core biopsy. Although the median time from first assessment to diagnosis was slightly shorter for Fast Track, the 90<sup>th</sup> percentile time was slightly longer for Fast Track in every subgroup except core biopsy with cancer diagnosis.

### DISCUSSION

This study has demonstrated that facilitated referral to diagnostic imaging can significantly reduce the time from abnormal screening mammogram to diagnosis. As expected, this reduction was concentrated in the subinterval from notification of

abnormal result to first assessment procedure. Regardless of Fast Track status, investigation times were shorter for those with cancer, reflecting the independent effect of suspicion bias.<sup>12</sup> The Fast Track process improved timeliness for most women, but for those with high-suspicion screens and those ultimately diagnosed with cancer, the added value of the Fast Track process was minimal.

Compared with BC data from 1998 (median 3.7 weeks; 90<sup>th</sup> percentile 12.1), wait times from abnormal screen to diagnosis are shorter at Fast Track centres (median 2.9 weeks; 90<sup>th</sup> percentile 12.1), but longer at non-Fast Track centres (median 4.1 weeks; 90<sup>th</sup> percentile 13.0). We believe that the somewhat longer wait at non-Fast Track centres compared with 1998 statistics is likely due to the increased volume of screening exams handled by the SMPBC each year, together with a shortage of technicians. The total number of exams in 1998 was 189,978 compared with 266,792 in 2006, an increase of over 40%. The Fast Track results compare favourably with data from 7 Canadian provinces reported in 2001 (median 3.7 weeks; 90<sup>th</sup> percentile 11.3),<sup>13</sup> especially in view of increasing demand arising from population growth and aging.

Shortening the time to diagnosis may reduce anxiety and increase client satisfac-

tion. Qualitative analysis of focus group data was conducted when the Fast Track pilot was initially evaluated. These data revealed that satisfaction with support received from health professionals was highest among the Fast Track group, particularly during the time from abnormal screen to the next test.<sup>2</sup> Of the interventions tested, Fast Track was the group with the lowest proportion reporting unnecessary delay.

Family doctor enrollment in the Fast Track process continues to grow as the number of Fast Track facilities increases. The process requires an effective information system to manage patient referral. Several "fail-safe" features were incorporated: a computer message to the data entry clerk if the films are not signed out to the selected Fast Track facility; result letters to family doctors to indicate to which facility the patient's films have been sent; and result letters to women asking them to contact their family doctor if no one has called to arrange further tests. Special fax forms and labels help ensure that Fast Track patient referrals can be identified easily by the diagnostic imaging staff to process in a timely manner. Family doctors are pivotal to patient support. Fast Track ensures that communication with the family doctor is maintained so that support can be provided to the few patients who may require additional information about their screening results. This approach contributes to the high level of acceptance and success.

Data have been reported by other Canadian provinces on strategies to reduce wait times. In the Manitoba Breast Screening Program, direct referral to a diagnostic facility or a breast health centre significantly reduced wait times from abnormal screen to diagnosis, compared with controls. The group referred to a diagnostic facility had significantly shorter wait times from screening to first assessment, however those referred to a breast health centre had significantly shorter time from first assessment to diagnosis.<sup>14</sup> A Nova Scotia study reported on improvements in the wait for a biopsy after diagnostic imaging as a result of patient navigation.<sup>15</sup> A national report on screening program performance for 2001 and 2002 showed that wait times improved slightly compared to 1998-1999, in spite of sub-

stantial increases in demand for diagnostic assessment services.<sup>16</sup>

International data suggest that the interval from abnormal screen to diagnosis in British Columbia is fairly typical. A prospective study of the frequency and causes of delay to diagnosis after breast cancer screening in Norway reported that 93.8% of women received their diagnosis within 3 months, which is similar to our 90<sup>th</sup> percentile wait time of 12 weeks.<sup>17</sup> It is important to note that in some countries, such as the United Kingdom and Australia, the program providing the screens is also responsible for conducting the diagnostic investigations by referral to clinics which are affiliated with one or more screening centres, building "facilitated referral" into the process.<sup>18,19</sup> In 1988, when the SMPBC (the first Canadian organized breast screening program) was initiated, a decision was made to refer women with abnormal screens to their family physician to coordinate diagnostic investigations. This was in part to avoid duplicating existing diagnostic services and in part to secure support from the medical community for organized breast screening. The introduction of facilitated referral was a step toward integrating the process to provide more efficient and effective care.

The strength of this study was the population-based data which provide a large, relatively unbiased sample across a large geographically-defined area. One limitation was the inability to distinguish delays resulting from patient, physician, or system factors. Although most women want diagnostic tests performed as quickly as possible, some need time to digest the information, or may attend a clinic they prefer rather than one that can see them quickly. There is the potential for volunteer bias among family doctors who participate in Fast Track versus those who do not because the two groups may differ in unmeasured factors that could affect wait times or access to diagnostic centres, although it is not possible to predict the direction of any potential effect on study results. P-values must be interpreted with caution because statistical significance can be attained for small differences when using a large sample, so clinical significance must also be considered.

This study showed that facilitated referral to diagnostic imaging can markedly

reduce the time from abnormal screen to diagnosis, thereby reducing anxiety for women and their families, and reducing time to treatment for those diagnosed with breast cancer.

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## RÉSUMÉ

**Contexte :** Le programme de dépistage mammographique de la Colombie-Britannique (SMPBC) a permis la mise en place d'un suivi rapide (« Fast Track ») par imagerie diagnostique après des essais portant sur cinq scénarios visant à réduire le délai entre les mammographies de dépistage donnant des résultats anormaux et les diagnostics ultérieurs. L'objectif de cette étude était de comparer les délais rencontrés par les patientes suivant que celles-ci faisaient l'objet d'un suivi rapide ou d'un suivi classique.

**Méthode :** Les données concernant les femmes dont une mammographie s'est révélée anormale entre le 1<sup>er</sup> janvier 2003 et le 30 juin 2005 (N = 40 292) ont été extraites de la base de données du SMPBC. Après suppression des données non exploitables, 39 607 mammographies ont finalement été analysées. La médiane et le neuvième décile du délai d'attente ont été calculés pour l'obtention d'un diagnostic après une mammographie anormale et pour trois sous-intervalles : entre l'examen mammographique et l'avis à la patiente; entre l'avis à la patiente et la première évaluation; et entre la première évaluation et le diagnostic.

**Résultats :** Le tiers des mammographies anormales a fait l'objet d'un suivi rapide par imagerie diagnostique. Sur l'ensemble des données, comparativement au protocole classique, le suivi rapide permettait de raccourcir de huit jours le délai médian entre la mammographie anormale et le diagnostic. Aucune différence significative n'a été constatée entre les deux protocoles pour ce qui est du délai séparant l'examen mammographique et l'avis à la patiente. Le délai médian entre l'avis à la patiente et la première évaluation était de 1,1 semaine pour le suivi rapide et de 2,4 semaines pour le suivi classique, soit une réduction de 9 jours (54 %) du délai ciblé par la stratégie. La distribution des délais entre la première évaluation et le diagnostic n'a différé de manière significative que pour les patientes qui s'étaient soumises à une microbiopsie (délai plus court de 3 jours en moyenne pour le suivi rapide).

**Interprétation :** Le fait de faciliter l'aiguillage des patientes vers l'imagerie diagnostique réduit de plus de moitié le délai entre l'avis de mammographie anormale et la première évaluation. Des stratégies supplémentaires devront être mises en place pour optimiser les recherches diagnostiques basées sur l'imagerie.

**Mots clés :** mammographie; tumeurs du sein; techniques et méthodes diagnostiques; listes d'attente; dépistage de masse



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