子宮頸細胞檢驗手冊

Cervical Screening Manual

子宮頸普查

CERVICAL SCREENING

子宮頸普查計劃
Cervical Screening Programme

衞生署
Department of Health

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1. Background

1.1 Introduction

The Chief Executive's Policy Address in 2001 pledged to launch a Cervical Screening Programme (CSP) for women in collaboration with other health care providers in 2003-2004. In December 2001, a Cervical Screening Task Force (CSTF) chaired by the Director of Health was set up to oversee the planning and implementation of the CSP. Members included representatives from professional Colleges, university experts, service providers from both the public and private sector, non-government organizations and women's groups.

In Hong Kong, cervical cancer is the 5th commonest cancer, registering 444 new cases in 2000[1]. It is the 8th commonest cause of cancer death among women, with 128 deaths from cervical cancer in 2001. Most of these deaths were avoidable if an effective screening programme were in place. While incidence and death rates from cervical cancer have been declining over the past decade, they remain high relative to countries that have organized cervical screening programmes.

At present, most of the cervical smears are done opportunistically and there is little collaboration between the public and private sectors. Screening practices vary considerably among different service provides and coverage rate is relatively low. Furthermore, many low-risk women are receiving screening more often than they need, whereas many high-risk women are not screened at all. Quality management indicators and monitoring systems over smear taking and examination are lacking. There is no central registry that keeps tracks of all smear results to monitor the effects of cervical screening and evaluate its performance.

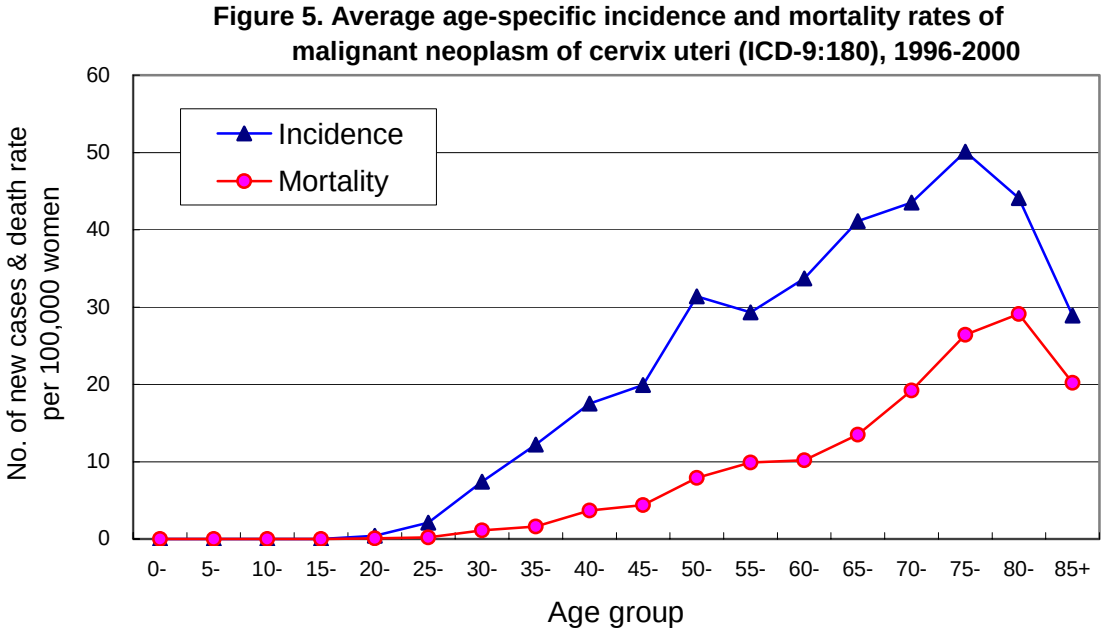
The Department of Health (DH) is going to launch a territory-wide cervical screening programme in 2004. The CSP aims to increase the coverage rate of cervical screening and ultimately, reduce the incidence and mortality of cervical cancer in Hong Kong. This manual provides a practical guide to smear taking and relevant information on cervical cancer screening.

1.2 Cervical Cancer and its Pre-Cancerous Stage

1.2.1 Cervical cancer

In Hong Kong, cervical cancer is the 5th commonest cancer among women with 444 new cases accounting for 4.6% of all new cancers in women in 2000. The median age at diagnosis of cervical cancer is 53 years, which is 12 years earlier than the median age at diagnosis of 65 years for all cancers in women. Both incidence and mortality rates are very low before 25 years of age, but rise sharply afterwards. The peak incidence rate is attained at the age group 75-79 years while the peak mortality rate is attained at an older age group 80-84 years (Figure 1).

Figure 1 - Average age-specific incidence and mortality rates* of malignant neoplasm of cervix uteri (ICD-9:180), 1996-2000



* The average age-specific rates are based on pooling of data for 5 years to remove random fluctuations in individual year. The rates are computed as the total number of new cases (deaths) over the 5-year period divided by the mid-period female population in each age group.

1.2.1.1 Symptoms

- Asymptomatic in early phase
- Early symptoms: postcoital, intermenstrual or postmenopausal bleeding
- Tumour necrosis ⇨ blood-stained or foul smelling vaginal discharge
- General symptoms: weight loss and malaise
- Late stage metastasis:
    - to lymphatic and vascular structures ⇨ leg oedema
    - to nerve ⇨ pain
    - to bladder ⇨ haematuria, frequency, dysuria, incontinence
    - to rectum ⇨ diarrhoea, tenesmus or rectal bleeding

1.2.1.2 Signs

- General examination: pallor, lymphadenopathy, ankle oedema
- Pelvic examination: blood stained vulva and vagina
- Cervical tumour / ulcers

1.2.2 Pre-cancerous stage of cervical cancer

Studies have demonstrated that invasive cervical cancer arises as a consequence of progression from mild dysplasia through severe dysplasia to carcinoma-in-situ. Table 1 showed the commonly used classification system for these pre-invasive lesions as different grades of cervical intraepithelial neoplasia (CIN 1, 2, 3). Some of the CIN lesions will regress to normal, but a significant proportion will progress into cervical cancer in 10-15 years' time (Table 1).

Table 1 - Progression of CIN lesions to cervical cancer

	CIN I	CIN 2	CIN 3
Regression	60%	40%	33%
Progression to CIN 3	10%	20%	---
Progression to cancer	1%	5 %	12%

Most of the CIN lesions are asymptomatic and can only be detected by cervical screening. Given appropriate treatment, the pre-cancerous lesions will not develop into cervical cancer.

1.2.2.1 Follow-up management of CIN lesions

Patients with CIN lesions should be referred for colposcopy. After confirmation of diagnosis, the treatment options include:

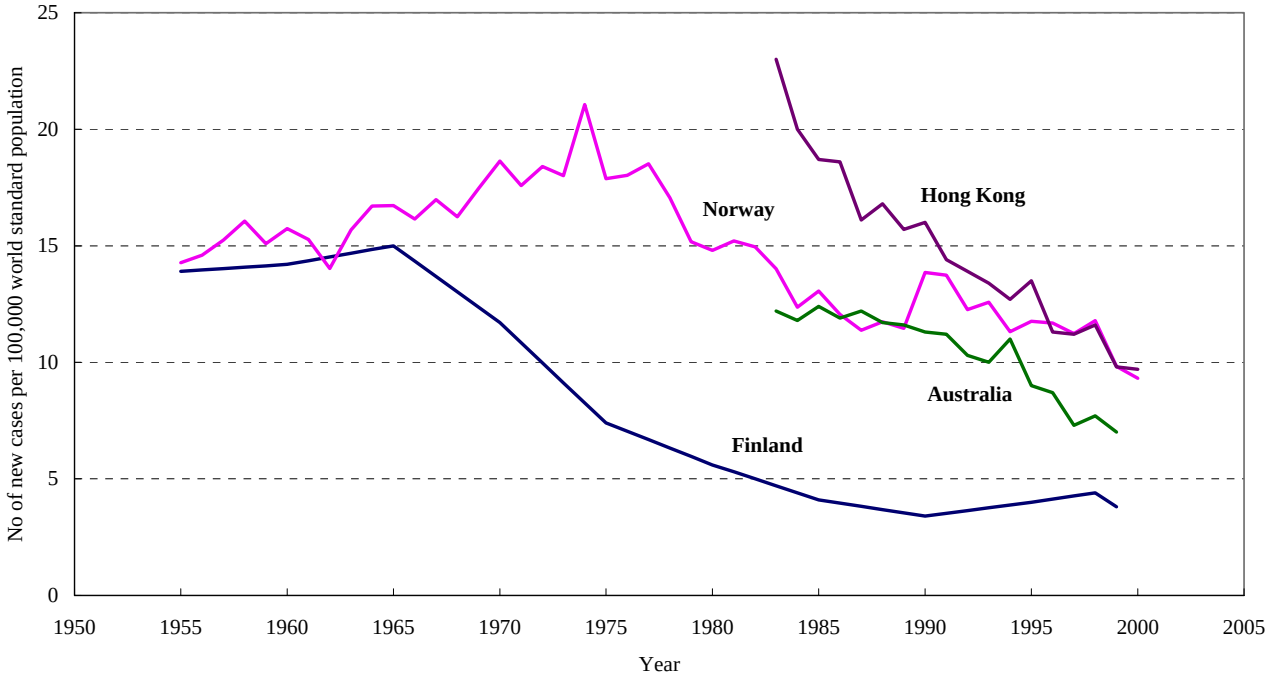
- Conization
- Cryocautery
- Laser vaporization
- Loop electrosurgical excision

2. Cervical Screening Programme (CSP) in Hong Kong

2.1 Cervical Screening

Many overseas countries experienced a marked decrease in incidence and mortality of cervical cancer after the introduction of national cervical screening programmes (Figure 2).

Figure 2 - International comparison of age-standardized incidence rates of cervical cancer.



A number of surveys conducted in Hong Kong showed that a substantial proportion of women were not receiving cervical screening. A telephone survey conducted by the University of Hong Kong during 1997-1998 on women aged 20-77 years showed that 43% of respondents with a sexual history ever had a cervical smear. The Thematic Household Survey in 2002, commissioned by the Census and Statistics Department found that 35% of females aged 15 and over had cervical smears in the past. A territory-wide cervical screening programme will be launched by the Department of Health, Hong Kong SAR in early 2004. Regular triennial screening following two consecutive yearly negative smears is recommended.

2.1.1 Target population

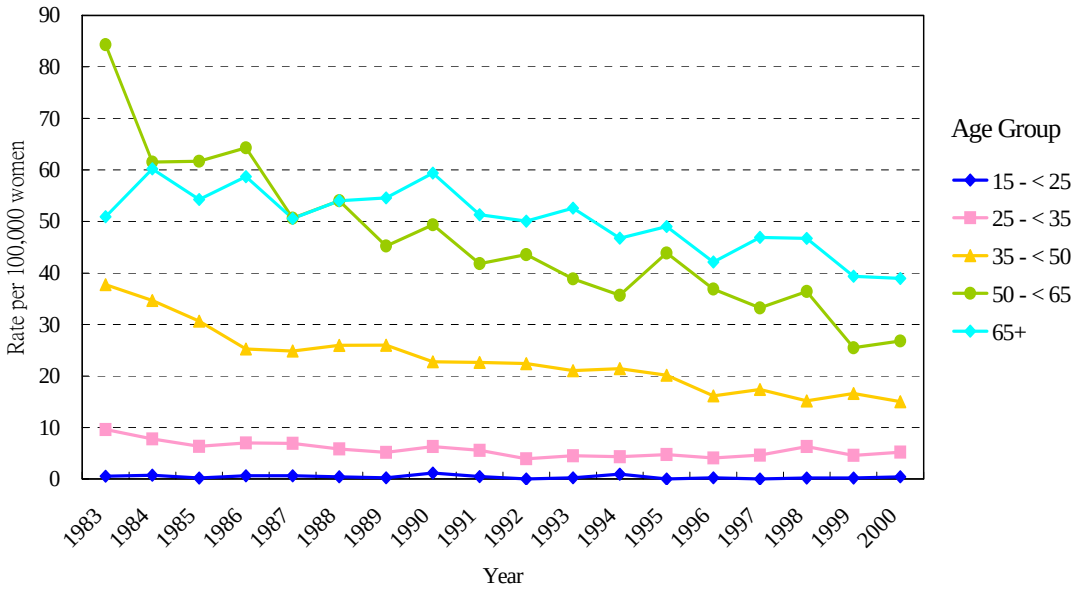
- Women aged 25-64 years who have ever had sex should be screened.
- Women aged below 25 who have increased risk profile may also be screened.

- For women aged 65 or above, screening may be discontinued if 3 recent consecutive smears taken within 10 years are normal. Those who have never had a smear should be offered 2 tests at an interval of 1 year and then 1 test 3 years later.
- Women who have never had sex or who have total hysterectomy (with cervix removed) performed need not receive cervical screening.
- *Why not start screening at age <25?*

  Younger women have:
  - Very low incidence of cervical cancer (Figure 3)
  - Higher incidence of dysplasia which mostly regresses
  - Very low risk of progression to cancer
  - Long latency of CIN

  Therefore, only younger women at high risk need to be considered for screening.

Figure 3 - Age-specific incidence rate for cervical cancer, 1983-2000



2.1.2 Screening interval

- The recommended interval for cervical screening is annually for the first two years, followed by 3-yearly cervical smears until 64 years old, i.e. 1,1,3,3,3…-yearly smear cycle.
- At the beginning of the screening cycle, 2 consecutive annual smears are suggested so that false negative smears may be detected.
- Women with high-risk profile e.g. immunocompromised status may be screened more frequently, at the discretion of the clinician.

Table 2 - Reduction in cumulative incidence at different screening intervals

Interval between screening	Reduction in cumulative incidence	Number of tests needed from age 25-64
1 year	93.5%	40
2 years	92.5%	20
3 years	90.8%	13
5 years	83.6%	8
10 years	64.1%	4

The International Agency for Cancer Investigation obtained data from cervical screening programmes in developed countries including United States and Europe[2] (Table 2). It was shown that the marginal benefits of annual screening over 3-yearly screening are negligible, but the costs are considerably higher.

Furthermore, taking cervical smears too often may result in unnecessary referrals, emotional stress, unnecessary interventions and may even overload health service providers. Therefore, cervical screening at 3-yearly intervals is most cost-effective.

2.1.3 Target coverage

- The effectiveness of a screening programme in reducing the mortality of cervical cancer does not merely depend on the screening interval. It is important that a high coverage rate is achieved.
- Local surveys suggested that the current coverage rate for women is around 35-43%.
- The CSP aims at a coverage rate of 60% among women aged 25-64 years to be achieved 3 years after launching.
- In the long term, the programme coverage should achieve 80% or more, which is in line with international best models (Table 3). According to overseas experience, it usually takes 6-10 years for an organized cervical screening programme to reach coverage rates between 65% and 85%. Doctors and nurses are going to take up the role of smear takers for our target population.

Table 3 - Cervical cancer screening programme in different countries

Country	Interval (years)	Starting Age	Coverage
Australia	2	18 years/ one or two years after first sexual intercourse	62% (1996-1997)
Canada (Canadian Task Force on Preventive Health Care)	After 2 normal smears, screen every 3 years	Cervical smears are recommended following initiation of sexual activity or age 18	-
Denmark	3	20-30	80%
Finland	5	30	Almost complete since the 70's
United Kingdom	3-5	20	84% (1999)
United States (United States Preventive Services Task Force)	At least every 3 years	21 years or within 3 years of onset of sexual activity (whichever comes first)	-
United States (American Cancer Society)	Every year with the regular Pap test or every 2 years using liquid-based test	3 years after women begin having vaginal intercourse, but no later than age 21 years	-

2.1.4 Service providers

Currently, cervical smear services are provided by:

- Doctors in private sector: general practitioners, gynaecologists, family physicians
- Family Planning Association of Hong Kong (FPA)
- DH: Maternal and Child Health Centres (MCHC), Women Health Centres (WHC), Elderly Health Clinics, Social Hygiene Clinics
- Well Women Clinics of Tung Wah East Hospital and Kwong Wah Hospital
- Hospital Authority
- Other clinics and hospitals

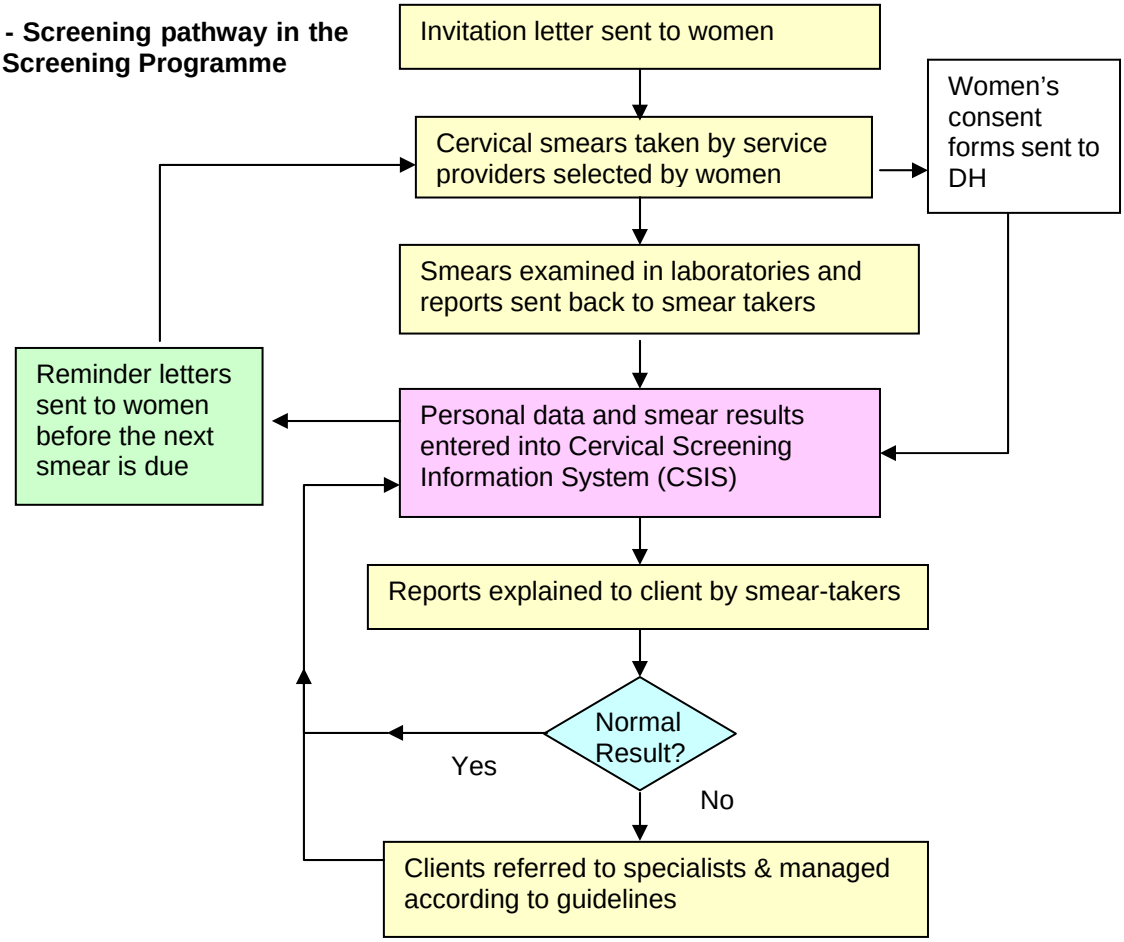
2.1.5 Cervical Screening Information System (CSIS)

The CSIS of the DH is a key element of the CSP, which serves as a central registry for the smear results and personal data of all women enrolled in the CSP (Figure 4). The CSIS will support multiple functions as follows:

- Support enrolment of target population
- Maintain screening histories and results
- Track utilization and follow-up

- Send reminder letters to women
- Facilitate record linkage across service providers
- Generate indicators for programme coverage and quality assurance
- Facilitate research and evaluation of the programme

Figure 4 - Screening pathway in the Cervical Screening Programme



2.2 Call-recall System

A call-recall system is needed to inform and remind eligible women to go for cervical screening. Once registered with the CSIS, DH will send reminder letters to these women when they are due for their next smears. At the same time, doctors may also send letters to their patients to remind them to have cervical smears taken.

2.2.1 Call system

After the Cervical Screening Programme is launched, invitation letters will be sent to women in Hong Kong by post, informing them of the need for cervical screening. A cervical screening booklet will be enclosed for their information. Women can choose their own service providers to suit their needs. Clinicians may also send invitation letters to their own patients. Remember to be flexible when women make their appointments at your clinic.

2.2.2 Recall system (reminder / defaulter tracing)

- Women who have their tests overdue or who do not respond to abnormal smear results should be reminded again.
- Reminder system may offer considerable gains in cervical smear coverage. Women who visit the clinics may benefit from poster reminders, but others may respond to telephone calls or letters.

2.3 Opportunities to Promote Cervical Screening

Even if a call-recall system is in place, there may be women who do not respond to invitation and others who may newly become eligible for screening. Therefore, medical practitioners and nurses should take every opportunity to promote cervical screening.

2.3.1 Clinic premises

Posters on cervical screening could be displayed in the clinic.

2.3.2 Reception

The receptionist may be trained to prompt female clients for cervical smears. A fact sheet has been prepared for clinic nurse / receptionist. They may give the clients booklets on cervical screening together with a Woman Health Checklist.

2.3.3 Waiting room

Posters may be displayed in the waiting room. Adequate supply of booklets (which can be obtained from the DH), could be placed in the waiting room to provide education materials and facilitate dissemination of information. A VCD on cervical screening for the public has been prepared by the DH. It can be shown to the patients while they are waiting to see the doctor.

2.3.4 Consultation

Clinicians may advise female patients of the importance of cervical screening and offer cervical smear services to women who are either overdue for a test or never been screened. Evidence shows that brief advice from doctors is effective in increasing uptake of cervical screening. Doctors may explore the reasons for not having cervical smears such as fear of pain, lack of knowledge or embarrassment and advise them accordingly.

2.3.5 Other settings

Women may also be prompted, when appropriate, to have cervical screening while they are in the waiting hall of emergency departments or during hospitalization.

2.4 Overcoming Barriers to Cervical Screening[3,4]

It is important for doctors to elicit and address the barriers to cervical screening in order to increase the uptake rate. Several ways of handling barriers to cervical screening are listed below.

2.4.1 Embarrassment

"You're right that many women find cervical smear embarrassing, but it can save lives."; "I can refer you to a female doctor if you wish."

2.4.2 Fear of pain

"Some women may feel discomfort rather than pain while they are having cervical smears taken. We can stop at any stage during the test. Please let me know if it hurts and which position is more comfortable for you."

2.4.3 Fear of abnormal result

- "Can you tell me why you say so? Is there someone you know of has cervical cancer?"
- "Majority of the smear results are normal, less than 10% of Pap smears need to be repeated. Sometimes, a need to repeat smear is due to technical reasons."
- "Even if abnormal cell changes are detected, some of them will regress by themselves. Pre-cancerous lesions can be treated effectively to prevent the progression to cancer."
- "Some people may be quite apprehensive of receiving a phone call for their smear result. I can arrange an appointment to explain the result to you. What do you think?"

2.4.4 No time for a test

- "The cervical smear takes only a few minutes to complete and I can arrange a convenient appointment time for you."
- "I agree that your job is important, but I think your health deserves higher priority. After all, one cannot work without good health."

2.4.5 Doubt about reliability

- "You may have heard from the news that some cancers are missed by the cervical smears. In fact, no test is 100% accurate, but cervical smears are still the best available test to prevent cervical cancer."
- "There is evidence that regular screening with cervical smears can effectively reduce the number of cases and deaths from cervical cancer."

2.4.6 No symptoms at all

"Early cervical cell changes usually cause no symptoms. Cervical smear detects these early changes so as to prevent them from developing into cancer."

2.4.7 No longer sexually active or only had one partner

"Cervical cancer may develop any time after a woman has started sexual activity, and development of cancer may take many years."

2.4.8 Cervical smear is a test for cancer

"Yes, it's also a test for detection of early cell changes in the cervix, which may progress to cervical cancer over years if left unattended."

2.5 Key Messages for Clients

2.5.1 About cervical cancer

- Cervical cancer is one of the 10 most common female cancers in Hong Kong.
- Cervical cancer can affect any woman who has ever had sex - no matter whether she is single, married or widowed.
- A woman still needs cervical screening even after she has reached menopause.
- There is increased risk for women who have had multiple sexual partners, but women who have only one sexual partner also need to have cervical smears regularly.
- Cervical cancer usually develops slowly, thus allowing sufficient time to be detected by cervical smears.
- Cervical cancer is one of a few cancers that can be prevented by regular screening.

2.5.2 About cervical smear

- simple, quick and basically painless
- need to be done only once every 3 years after 2 initial normal consecutive annual smears
- can prevent about 80-90% of cervical cancer if done regularly
- women with no symptoms could also have cervical smears

2.5.3 Notes on booking appointment

- Avoid vaginal douching, sexual intercourse and use of vaginal medicines for 24 hours before taking the smear as these may wash away or conceal abnormal cells.
- Remind the clients that they should avoid having cervical smears during menstruation.

2.6 Referral

For the benefit of the client, please make appropriate referral upon her request. Common reasons of such request include preference for female doctor, gynaecologist, or lower fees.

3. Taking a Quality Cervical Smear[5,6,7]

3.1 Normal Anatomy of the Female Pelvis and Cervix

3.1.1 Female pelvis

- Most women have anteverted uterus with cervix pointing downward and backward.
- Other women have retroverted uterus with cervix pointing upward and forward.
- Vaginal wall may be lax and prolapsed in multiparous women.

3.1.2 Cervix

- The normal cervix is the most caudal part of the uterus.
- It measures 2.5-3 cm in length.
- It consists of vaginal part and supravaginal part.
- It can be divided into external os, endocervical canal, internal os.
- The cervical stroma is made up of fibrous, muscular and elastic tissue with increasing proportion of fibrous tissue when approaching the internal os.

3.1.3 Squamo-columnar junction (SCJ)

- The SCJ is the point at which the endocervical columnar epithelium meets the squamous epithelium.
- Before puberty, it is located at the external os ('original' SCJ).
- At puberty, the cervix grows longer and leads to eversion of cervix (erosion / ectropion).
- The columnar epithelium therefore is exposed to the acidic environment leading to replacement of the everted columnar epithelium with squamous epithelium.
- This is called squamous metaplasia and a new SCJ is produced.
- The zone between the new and old SCJ is called *transformation zone* which is them commonest site of cervical carcinoma.

Normal cervix in reproductive age

- 'Original' squamous epithelium lined the vaginal portion
- Stratified non keratinized glycogen laden in reproductive age
- Thinned with loss of differentiation and glycogen at menopause

Normal cervix in postmenopausal women

- Cervix flushed with vaginal vault
- The transformation zone rolls back into the endocervical canal
- Cytobrush or Cervexbrush is needed to ensure the whole transformation zone is sampled.

3.2 Record Review

- For old cases, always review previous records
- Check for previous smear results
- Check for history of cervical cancer or pre-cancerous cell changes
- Check for history of hysterectomy

3.3 Relevant History Taking

- Confirm sexually active / parity and last menstrual period
- Contraceptive methods / hormonal drug usage
- Previous smear taking history and results / previous history of cervical cancer or CIN lesions.
- Previous history of hysterectomy / sub-total hysterectomy / Loop Electrosurgical Excision Procedure (LEEP) or cone biopsy
- History of chemotherapy and radiotherapy
- Present gynaecological problems: abnormal vaginal discharge, post-coital bleeding, intermenstrual bleeding and postmenopausal bleeding

3.4 Importance of a Good Quality Smear

The sensitivity of the cervical smear depends greatly on the quality of the smear. The presence of inflammatory cells, blood or debris may affect the interpretation of the smear. Therefore, smear should be deferred during menstruation or vaginal infection.

A fully satisfactory cervical cytology sample contains

(i) Ectocervical component : Sufficient well preserved squamous cells indicating adequate sampling from the transformation zone of the ectocervix.

(ii) Endocervical component : Sufficient number of endocervical/squamous metaplastic cells indicating that the upper limit of the transformation zone is sampled. This also provides a sample for screening for adenocarcinoma and its precursors.

3.5 Optimal Timing for Cervical Smears

- Cervical smear taking should be avoided during menstruation. Care is taken not to mistake abnormal vaginal bleeding as menstruation.
- The optimal time for good results is around mid-menstrual cycle.
- So long as the client is not menstruating, cervical smear can be taken.

3.6 Equipment

3.6.1 Light source should be adequate and adjustable

3.6.2 Speculum

- Bivalve Cusco's speculum with blades of equal length is commonly used. Other types include single-blade Sims' speculum (for use in clients with posterior prolapse), Graves and Pederson speculum (the latter two have lower blade 1 cm longer than the upper blade for placement in the more distal fornix).
- Different sizes of speculum should be available for use (Figure 8).

Figure 8 - Speculum in different sizes

- Choose a speculum of appropriate size according to history such as parity, age, menopausal stage and experience from previous smear taking.
- Metal speculum should be sterilized before re-use. Beware of hot speculum taken out from autoclave. Disposable speculum should be used only once.

3.6.3 Cervical cell samplers (Figure 9)

- Ayre's spatula – commonly used in traditional Pap smears.
- Plastic broom sampler (Cervex brush): it provides more efficient sampling and reliable cell transfer, hence improving quality and accuracy of the test and reducing unsatisfactory smear but is more expensive.
- Endocervical brush (Cytobrush): obtain good endocervical sample but not ectocervical sample. It should not be used in pregnant women because of the risk of rupturing the membranes and introducing infection.
- In pre-menopausal women with an adequate external os, sampling with spatula or broom sampler is adequate. However, in postmenopausal women and in pre-menopausal women who have previous cervical surgery, endocervical

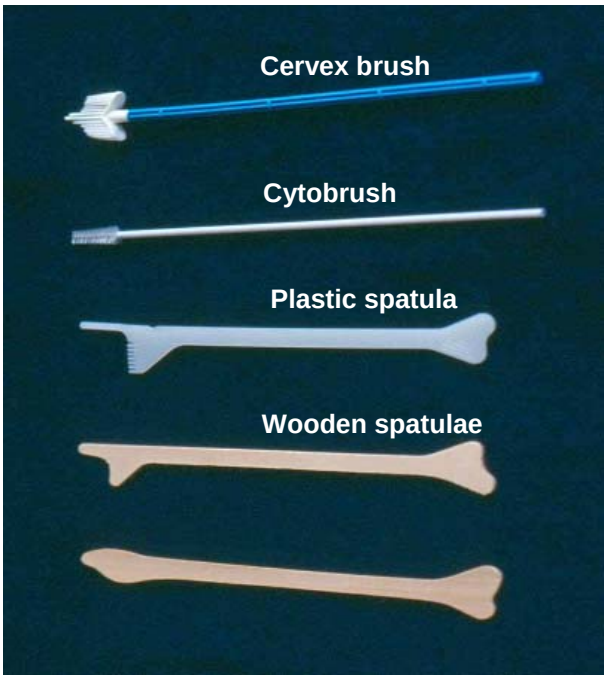


Figure 9 - Different types of sampling device

brush should also be used to ensure adequate sampling from the retracted squamo-columnar junction.

3.6.4 Fixative

Alcohol aerosol spray or vial containing 95% alcohol can be used as the fixative.

3.7 Labelling

- Glass slide or vial for liquid based cytology labelled with client's full name and ID number should be ready before sampling.
- Label the frosted end of glass slide with pencil as ink and paper labels would be washed off during processing in the laboratory.
- Cervical cytology request form: apart from personal details, clinical information should be included, as it would assist the cytologist in slide interpretation. Details should include client's age, last menstrual period, whether the client is pregnant, postnatal, postmenopausal, using hormone or IUCD. Any risk factors such as prior CIN or treatment, abnormal cervical appearance, or presence of contact or postcoital bleeding should also be written down on the request form.
- Check the name and ID number.

3.8 Explanation

- Explain to the client why she need cervical screening and the procedures involved. Use of anatomical models and sample instruments may be helpful.
- Tell the client to let you know if she feels discomfort during the test.
- Advise the client on relaxation techniques, such as deep breathing and relaxing leg muscles during the test to facilitate the process and reduce discomfort.
- Explain benefits of providing personal data and smear results to the Cervical Screening Information System maintained by the DH and obtain client's consent.
- Address any concerns and questions from the client.

3.9 Getting Ready and Positioning

- Male doctors are advised to be accompanied by female chaperone.
- Ensure privacy: e.g. close bed screen, lock room door and lower window curtain.

- Ask client to take off trousers and underpants.
- Drape her abdomen with a cloth/sheet.
- Ask the woman to lie supine on the examination couch, with knees flexed, and feet rest on the pedals or bed end.
- The left lateral position can be used if smears are difficult to obtain, such as in older women with lax anterior vaginal wall.
- Ensure that the client is comfortable.

3.10 Insertion of Speculum

- Cervical screening should be done before doing bimanual examination.
- Gloves should be worn on both hands before handling instruments.
- Lubricate speculum with warm water. Avoid using cream or jelly as they may interfere with cytological examination.
- Hold the speculum with blades closed. Inspect the vulva for any abnormality or atrophic changes before gently separating the labium minora to expose the vaginal orifice with your other hand.
- Align the speculum with the horizontal axis of the vagina. Slowly insert the speculum into the vagina with the tip pointing 45° downward to avoid touching the clitoris. Most of the discomfort is caused by pressure on the urethra and trigone.
- Ask the client whether she feels any discomfort. Look for non-verbal cues of discomfort such as facial grimacing, clenching of fist and tensing of leg muscles. Encourage deep breathing and muscle relaxation.
- On full insertion, open the speculum, exposing the cervix adequately.
- Table 4 summarizes the common reasons and solutions for failure to visualize the cervix.

Table 4 - Reasons for failure to visualize the cervix

Condition	Reason	Solution
The anterior vaginal fornix instead of the cervix is visualized.	The commonest reason of failure to expose the cervix is the tip of speculum has slipped into the anterior vaginal fornix, especially in nulliparous women. The speculum is not pointing downward on insertion.	- Elevate your hand, thus pivoting the speculum across the perineal body and depressing the speculum tips into the same axis as the cervix, or - Retrieve the speculum a little bit, then reinsert in *downward* direction.
The posterior vaginal fornix instead of the cervix is visualized.	The uterus is retroverted with the cervix pointing upward and forward.	- Depress your wrist, thus pivoting the anterior blade into the anterior fornix, or - Retrieve the speculum a little bit, then turn it in *upward* direction. Insert slightly deeper and open again.
Neither the cervix nor vaginal fornix is seen.	The speculum is not inserted deep enough.	- Close the blades and try to insert deeper, or - Use a longer speculum.
Lateral vaginal walls bulge inwards on opening the speculum	- Obese women - Vaginal prolapse	- Use a larger size speculum, or - Apply a condom onto the speculum (make a small scissor cut in the tip of the condom before re-insertion).

3.11 Cervical Cells Sampling

- Look for any obvious abnormality of the cervix. If there are signs of infection, you may postpone the test until the infection has been treated.
- Both the conventional and the liquid-based cytology methods for cervical cytology are deemed acceptable.
- A cervical ectropion (often wrongly called cervical erosion) is a normal area of columnar cells on the ectocervix. Its appearance is a well-demarcated, red velvety area on the ectocervix. It is more common in premenopausal women. No treatment is needed. If it is present, a smear including its border should be obtained as this represents the upper margin of the transformation zone.
- The cell collection technique for conventional smears and liquid based cytology is the same.

- The transformation zone must be selectively sampled as most cancers and precancerous lesions arise from it.
- In postmenopausal women or those with retracted transformation zone up into the endocervical canal, endocervical brush should also be used in addition to spatula / Cervex brush. It should not be used in pregnant women because of the risk of rupturing the fetal membranes and introducing infection.

3.11.1 Spatula

- Insert the spatula into the cervix through the speculum.
- Press the spatula onto the ectocervix and rotate 360 degree for several times.
- Use the pointed end for retracted squamo-columnar junction e.g. in post-menopausal women. If an ectropion is present, take sample from its margin using the blunt end of a spatula.

3.11.2 Cervex brush or other broom-head device

- Insert the Cervex brush into the cervix through the speculum.
- Insert the central bristles of the broom into the endocervical canal deep enough to allow the shorter bristles to fully contact the ectocervix. Push gently and rotate clockwise for 5 times.

3.11.3 Endocervical brush

- Use the spatula first to avoid bleeding resulting from Cytobrush sampling. Use the Cytobrush second, as endocervical cells deteriorate more rapidly than ectocervical cells.
- Insert the Cytobrush into the cervix until only the bottommost fibers are exposed outside the os.
- Slowly rotate 1/4 to 1/2 turn in one direction. Do not over-rotate as this may lead to trapping of cells in the bristles, which may not be transferred to the slide.

3.12 Transfer of Cells

3.12.1 Conventional cervical smear using glass slide (Figure 10)

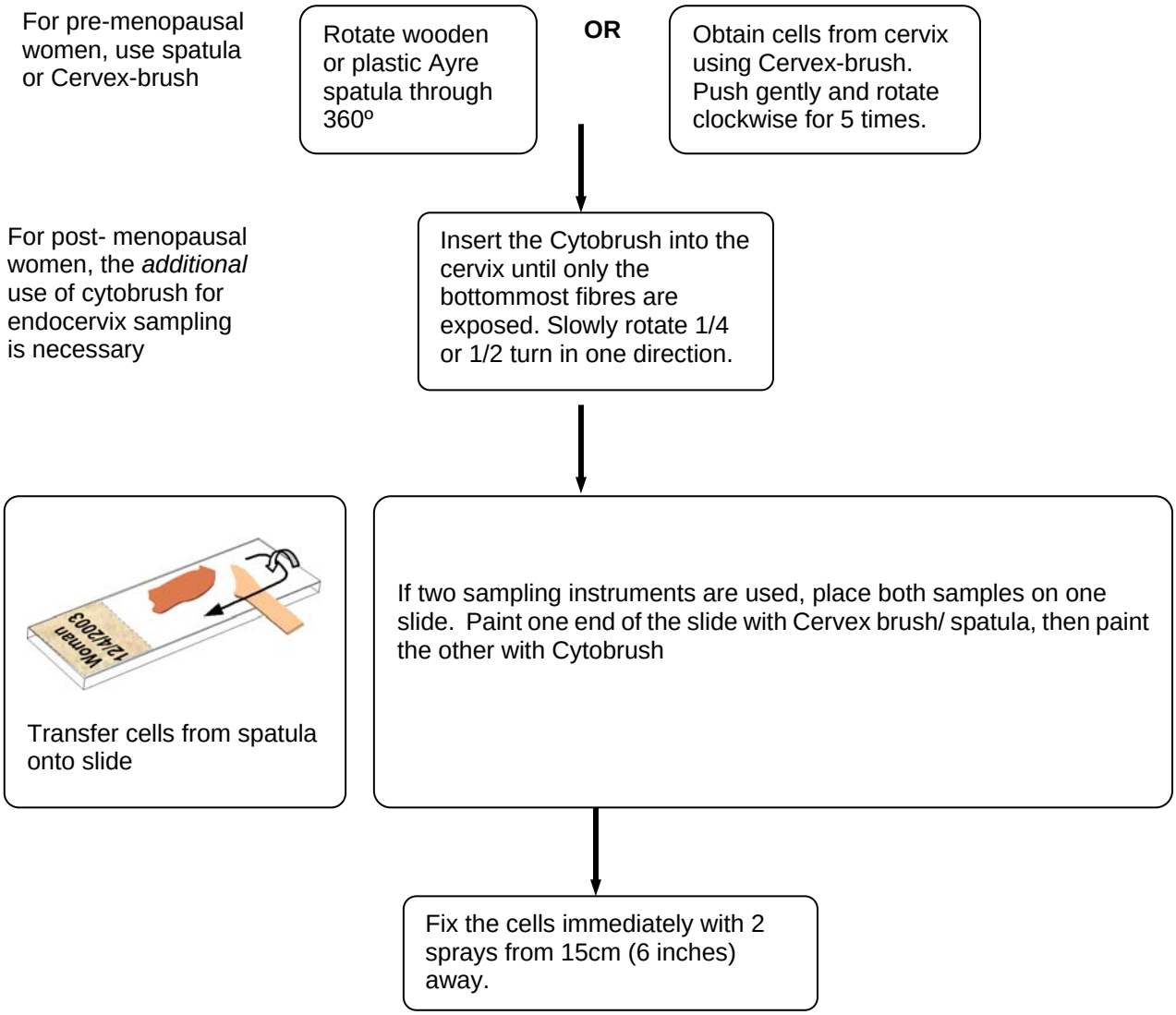
- Paint *both sides* of the spatula / Cervex brush onto the glass slide to produce an even and thin layer of cells.
- Fix the cells immediately with 2 sprays from a distance of 15 cm (6 inches) within 30 seconds to prevent air-drying of cells. If spray too close, some cells will be washed away or causing freezing artefact. Air-drying will cause degenerative

changes with loss of cellular features, thus affecting the accuracy of diagnosis. Alternatively, each glass slide can be placed in a separate container with 95% alcohol.

- If two sampling instruments are used, place both samples on one slide. Paint one end of the slide with Cervex brush or spatula, but do not fix it yet. Then paint the other end with Cytobrush by rolling it on the slide. Finally, fix the whole slide with spray.

- Transfer the slides to the laboratory in a slide box.

Figure 10 - Conventional cervical smear using glass slide



3.12.2 Liquid-based Cytology (Figure 11)

- The two common methods are

  - Collect the cervical cytology sample by plastic spatula or Cervex brush (broom head device) and endocervical sample by endocervical brush. Follow the steps as described in Figure 11.

  - Collect the cervical cytology sample by Cervex brush and simply drop the removable head into the collection vial.

3.13 Information Given to the Client Before She Leaves the Clinic[8]

- Slight vaginal bleeding may occur for 2-7 days and is normal.

- Advise the client to come back if bleeding persists beyond 7 days after smear taking; or go to the A&E department if heavy bleeding.

- Tell the client that the result will be available in 2-4 weeks' time. Discuss with her the arrangement of informing her of the result. Whether the result is positive or negative, the client should be informed.

- Reassure that 90% of smears are normal. However, a normal result means low risk, not no risk.

- The reasons of being recalled include inadequate / unsatisfactory sample or an abnormal result.

Figure 11 - Liquid-based Cytology

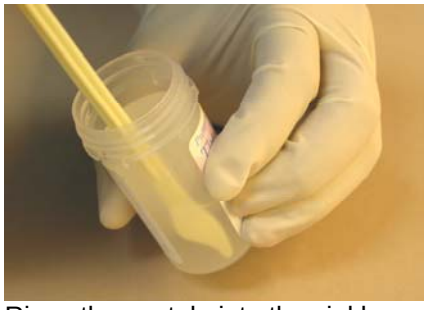
For pre-menopausal women, use spatula or Cervex-brush

Use Cervex-brush to obtain cells from cervix Push gently and rotate clockwise for 5 times.

OR

Rotate wooden or plastic Ayre spatula through 360º

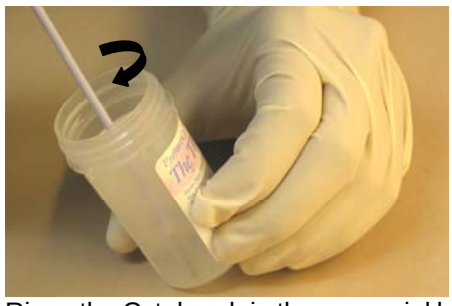
Rinse the brush into the vial by pushing it into the bottom 10 times and forcing the bristles apart. Swirl the broom vigorously and discard the brush.



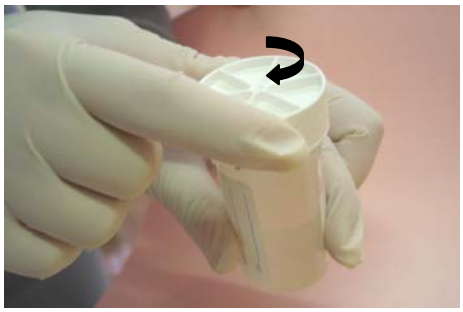
Rinse the spatula into the vial by swirling the spatula vigorously 10 times. Discard the spatula.

For post-menopausal women, the *additional* use of Cytobrush for endocervix sampling is necessary

Insert the Cytobrush into the cervix until only the bottommost fibres are exposed. Slowly rotate 1/4 or 1/2 turn in one direction.



Rinse the Cytobrush in the *same* vial by rotating 10 times while pushing against the vial wall. Finally, swirl the brush vigorously and discard the brush



Tighten the cap so that the torque line on the cap passes that on the vial.

4. Reporting System and Notification of Result

4.1 Reporting System – The Bethesda System 2001[9,10]

Most laboratories in Hong Kong report cervical smears using the Bethesda System (Table 5). The strength of this system is that it provides an evaluation of the adequacy of the specimen and encourages a descriptive diagnosis of abnormalities. For uniformity, this should be the default reporting system.

Table 5 - The Bethesda System 2001 for reporting cervical cytology

1. Specimen type	Conventional smear (Pap smear) vs liquid-based vs other
2. Specimen adequacy	1. Satisfactory for evaluation 2. Unsatisfactory for evaluation e.g. unlabelled specimen, broken slide, inadequate cellularity, excessive obscuring factors
3. General categorization (optional)	1. Negative for intraepithelial lesion or malignancy 2. Epithelial cell abnormality 3. Other
4. Automated review	Specify automated device and result, if used
5. Ancillary testing	Brief description of test methods and result
6. Interpretation / result	1. Negative for intraepithelial lesion or malignancy: (state if the following findings exist) - Organisms e.g. Trichomonas, Candida, HSV - Non-neoplastic findings e.g. reactive changes, glandular cells status post-hysterectomy, atrophy 2. Epithelial cell abnormality: - *Squamous cell:* Atypical squamous cells (ASC), Low-grade squamous intraepithelial lesion (LSIL), High-grade squamous intraepithelial lesion (HSIL), Squamous cell carcinoma (SCC), - *Glandular cell:* Atypical glandular cells (AGC), Adenocarcinoma in situ (AIS) 3. Other: endometrial cells in a woman ≥ 40 years old
7. Education notes and suggestions (optional)	

Table 6 shows the corresponding nomenclatures of cervical cells abnormalities detected by cytology and histology.

Table 6 - Squamous cell abnormalities and different nomenclatures[12]

Description	CIN grade	Bethesda	Papanicolaou classes
Normal	Normal	Within normal limit	Class I
Atypia: reactive or neoplastic	Atypia	ASCUS	Class II
HPV	HPV	LSIL	Class II
Mild dysplasia	CIN 1	LSIL	Class II
Moderate dysplasia	CIN 2	HSIL	Class III
Severe dysplasia	CIN 3	HSIL	Class III
Carcinoma in situ	CIS	HSIL	Class IV
Invasive carcinoma	Invasive carcinoma	Invasive carcinoma	Class V

4.2 Means of Notification to Client

- It is important to discuss with the client when and how to tell her the result in an agreed way after performing the test. Both positive and negative results should be notified. The client should be notified promptly if there is an abnormal result or the smear needs to be repeated. Failure to communicate the test findings to the patient is a common reason of legal claims against doctors.
- Common means of notification include phone call, mail and follow-up at the clinic. Follow-up in person is the preferred way as detailed explanation and discussion are possible.

4.3 Skills in Information Giving for Normal Result

i. Develop rapport: greet her and offer her a seat.

ii. Check awareness: check for background knowledge, in particular any misconceptions and worries.

iii. Give information: avoid jargon, and be mindful of the pace. Correct any misconception and break down information into categories to ease recall. Be sensitive to nonverbal cues of doubt. Repeat or emphasize on important points.

iv. Check understanding: ensure the client understands the result and answer any questions.

v. Discuss the plan: remind the due date for next smear / repeat smear / referral. Remember to involve the woman in decision-making (e.g. check if the appointment time is convenient to her). Remind her that no test is perfect and sometimes, abnormal cell changes may not be detected. Advise her to seek medical attention if she develops any vaginal symptoms before the next smear is due, even if her recent cervical smear result is normal.

4.4 Skills in Breaking Bad News for Abnormal Result

i.
ii. } As above.
iii.
iv.

v. Warning shot: to prime the client of a bad news, e.g. “I’m afraid that the result is more serious than expected.”

vi. Acknowledge feeling and emotion: initial responses to bad news include shock, disbelief, sadness and anger, etc. Acknowledge that her reaction is a normal response to bad news.

vii. Elicit her concerns: ask the client what the result means to her, in the light of her knowledge, family, occupation and social background. Try to address her concerns.

viii. Discuss management plan: explain the management / referral options and involve the client in decision making.

ix. Arrange follow-up: provide shared care with specialist. Respond to arising medical, psychological and social needs.

4.5 Explaining Terms to Clients[11]

It is important for clinicians to make sure that their clients understand the cervical smear results. To achieve this, explaining technical terms in an easy-to-understand language is often necessary. Table 7 is a summary of the explanations on different cervical smear results and the corresponding actions to be taken in different conditions.

Table 7 - Explanation on cervical smear results

Term	Explanation	Action
Unsatisfactory	- About 10% of all conventional smears are inadequate. - Possible reasons include insufficient cells obtained, inadequate fixation, poor spreading of smear, excessive blood or mucus.	- Repeat smear immediately if technically inadequate - May try other collection and preparation method (e.g. liquid based cytology) - If persistent (3 inadequate samples), refer for colposcopy assessment
Negative (± inflammation)	- Explain the term 'normal' - Remind her of the next smear date. - If symptoms develop, she still needs to consult a doctor despite recent normal smear	- If infection or atrophy is present, repeat smear after treatment (within 3 months)
ASC-US	- Suggests borderline cell changes. Not cancer - Around 50% of ASC-US is associated with HPV infection - Majority will revert to normal	- To ensure changes are not progressive, need to repeat smear in 4-6 months or need HPV DNA testing for making decision to refer for colposcopy - See Figure 13
ASC-H	- Borderline cell changes but cannot exclude moderate or severe cell changes	- Need to have colposcopy ±biopsy for further assessment - See Figure 14
LSIL (HPV/CIN1)	- Indicates mild abnormal cell changes or HPV infection (82-85%), but not cancerous. - Majority of LSIL will regress over 2 years. Immediate treatment is not necessary. About 15% of patients will progress to CIN2/3 and require treatment later - HPV is a common infection in sexually active women. Most of them cause no harm and there is no medical treatment for HPV. It will usually disappear spontaneuosly over 3 years.	- Need colposcopy ± biopsy to make sure the changes are as minor as the smear shows. - Sometimes, treatment may be needed. If not treated, the changes will be monitored more frequently. - See Figure 15
HSIL (CIN2/3)	- Indicates moderate to severe cell changes, but not cancerous. - Potential to progress to invasive cancer if left untreated. Risk of CIN3 to become invasive cancer is about 12% over 10 years.	- Need colposcopy ± biopsy - Mostly need treatment, which usually takes about 30 minutes under local anesthesia on an outpatient basis. Options include loop electrosurgical excision procedure (LEEP) and laser treatment. After treatment, need more frequent follow-up smears - See Figure 16
Invasive cancer	- Indicates some cell changes which may be cancer	- Need biopsy to confirm. Need discussion with specialist about the best treatment - See Figure 17

4.6 False Negative Result[13]

Cervical smears carry a false negative rate of 5-20%. Table 8 shows some causes of false negative result.

Table 8 - Causes of false negative result

Source of error		Solution
Sampling failure	- Failure in sampling the abnormal area - Failure in obtaining adequate cellular component for diagnosis - Excessive blood, mucus or inflammation - Malignant tumour may be covered by necrotic dead cells. The lesion fails to exfoliate despite adequate sampling.	- Ensure adequate exposure of cervix - Target the sampler towards the transformation zone - Circumferential collection of adequate samples - Take biopsy if gross tumour is present or refer the client to the gynaecologist
Transfer failure	- Failure in transferring the abnormal cells onto the slide, only about 20% of cells collected can be transferred to the slide - Unsatisfactory preparation of the slide such as blood smear with traumatized cells, layering of cells, air drying of slide and fixation artefact	- Liquid-based cytology provides better cells sample - Fixation soon after taking smear
Laboratory failure	- Smear of poor quality - Cells distorted by air drying - Scanty material for interpretation - Interpretation error	- Liquid-based cytology provides better cell samples - Properly trained staff for slide interpretation - Computer-assisted slide interpretation

4.7 Limitations of Cervical Smear

- No test is perfect. A negative result means low risk, not no risk, of having abnormal cell changes.
- Cervical/ vaginal cytology is an inaccurate test for detection of endometrial lesion.
- Exfoliated endometrial cells detected in woman < 40 years of age need not be reported in the cervical smear test.
- Endometrial cells found in women ≥ 40 years of age will be reported especially when endometrial cells are out of phase or in women after menopause. It may be associated with benign changes, hormonal alterations or endometrial abnormalities. Manage according to clinical condition.

5. Management of Cervical Cell Abnormalities[14]

5.1 Referral to See a Gynaecologist

Explanation of procedures of colposcopy at the time of referral may reduce patient anxiety. Written information may also be provided to the patient.

- Colposcopy is often done in a hospital day ward or specialist clinic.
- The client lies on a couch with a posture similar to that for cervical screening.
- A speculum is used to open the vagina.
- A colposcope is a magnifying instrument that examines the cervix and vagina. (Figure 12)
- It takes about 10-15 minutes and no anesthesia is required.
- Acetic acid is applied to see the extent of the lesion in the cervix, which may stain slightly. Iodine solution may be applied to show outer limit of abnormal areas.
- Sometimes, a biopsy may be taken for histological diagnosis.
- Further information and management details will be provided by the specialist following the colposcopy examination.

Figure 12 - Colposcope

5.2 Management Guidelines

The management guidelines of different conditions issued by the Hong Kong College of Obstetricians and Gynaecologists in 2002 are shown in Table 9 and Figure 13 to 18.

Table 9. - Criteria for referral to colposcopy

Cervical Smear	Significance	Suggested actions
Normal (± inflammation)	0.1%CIN 2-3	Normal screening program (Once every 3 years after 2 normal annual smears)
ASC- US	5-17% CIN 2-3 0.1-0.2% invasive	Repeat smear in 4-6 months. Refer for colposcopy if abnormality persists.
ASC-H	24-94% CIN 2-3	Refer for colposcopy and biopsy
Low grade squamous intraepithelial lesion (LSIL)	15-30% CIN 2-3 0.1% invasive	Refer for colposcopy and biopsy
High grade Squamous Intraepithelial lesion (HSIL)	70-75% CIN 2-3 1-2% invasive	Refer for colposcopy and biopsy
HSIL-cannot exclude invasion		Early referral for colposcopy and biopsy
Invasive cancer	53.8% invasive	Biopsy if frank growth, otherwise early referral for colposcopy and biopsy
Abnormal glandular cells (AGC- endocervical /endometrial *)		Refer for colposcopy and biopsy, endocervical sampling, cone biopsy and endometrial sampling may be required.
AGC-NOS	9-41% CIN2-3,AIS,Ca[5]	
AGC-favor neoplasia	27-96% CIN2-3, AIS, Ca[5]	* for AGC- endometrial cells -endometrial sampling first
AIS	48-69% AIS[5] 38% Adenocarcinoma[5]	
Endometrial cells on smear in		
a/ women after menopause	28% benign pathology, 12% significant pathology[6] (hyperplasia,endometrial carcinoma, sarcoma)	Investigation recommended
b/ women greater or equal to 40 years of age		Interpret the smear result together with the clinical findings to determine the management
c/ women < 40 years of age		Treat as normal

Figure 13 - Management of women with atypical squamous cells of undetermined significance (ASC-US)

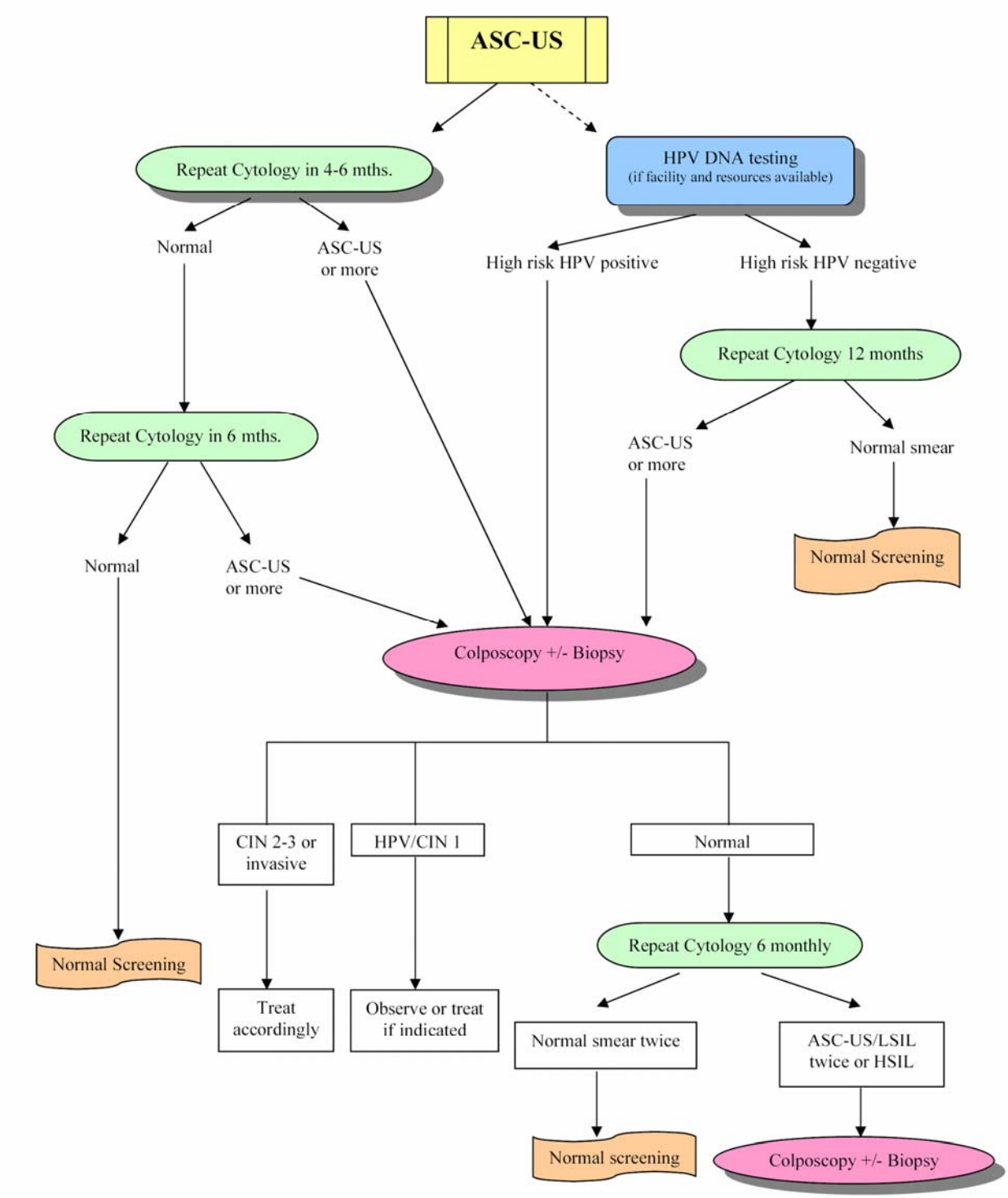


Figure 14 - Management of women with atypical squamous cells-cannot exclude high grade SIL (ASC-H)

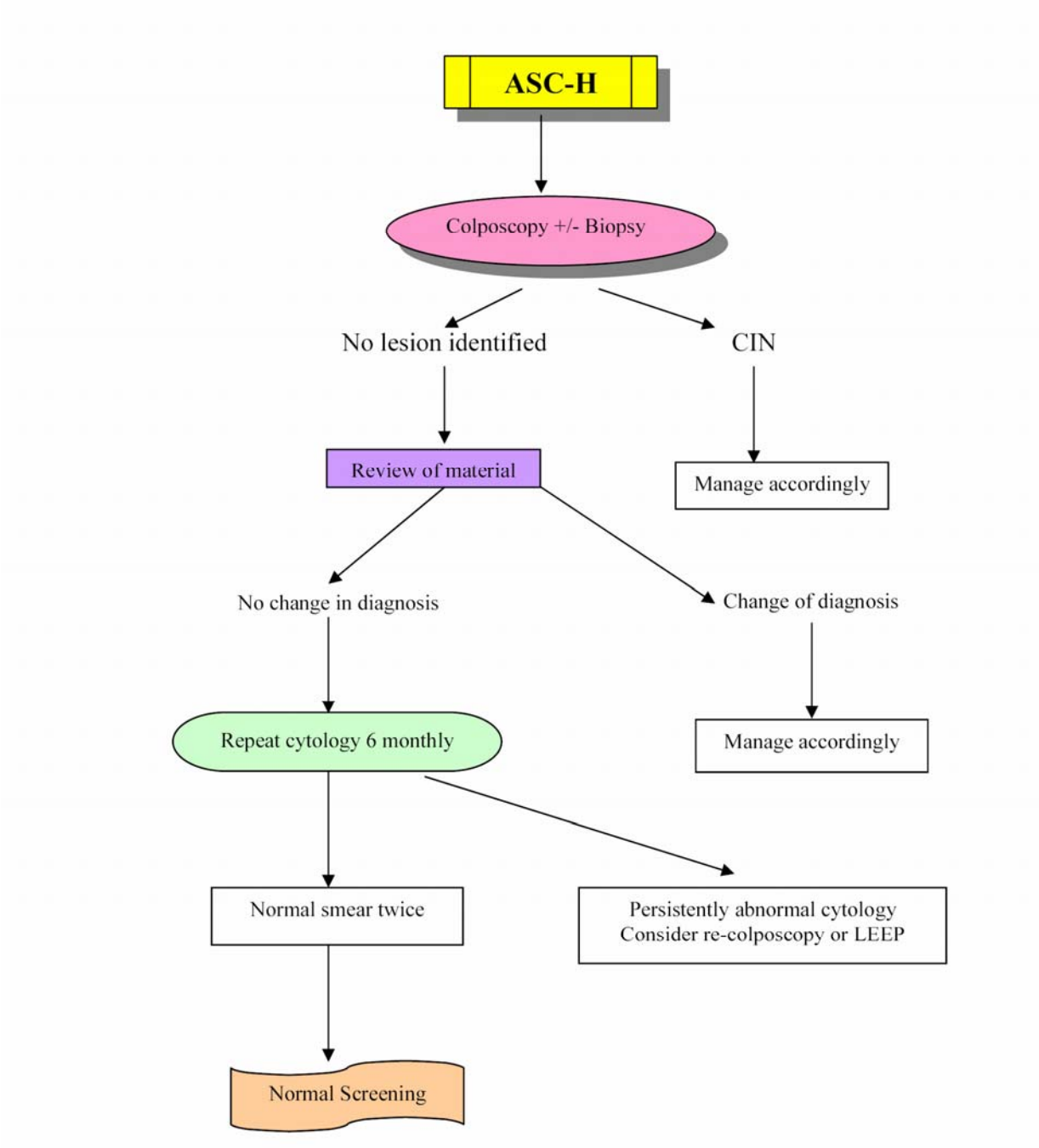


Figure 15 - Management of women with low-grade squamous intraepithelial lesion (LSIL)

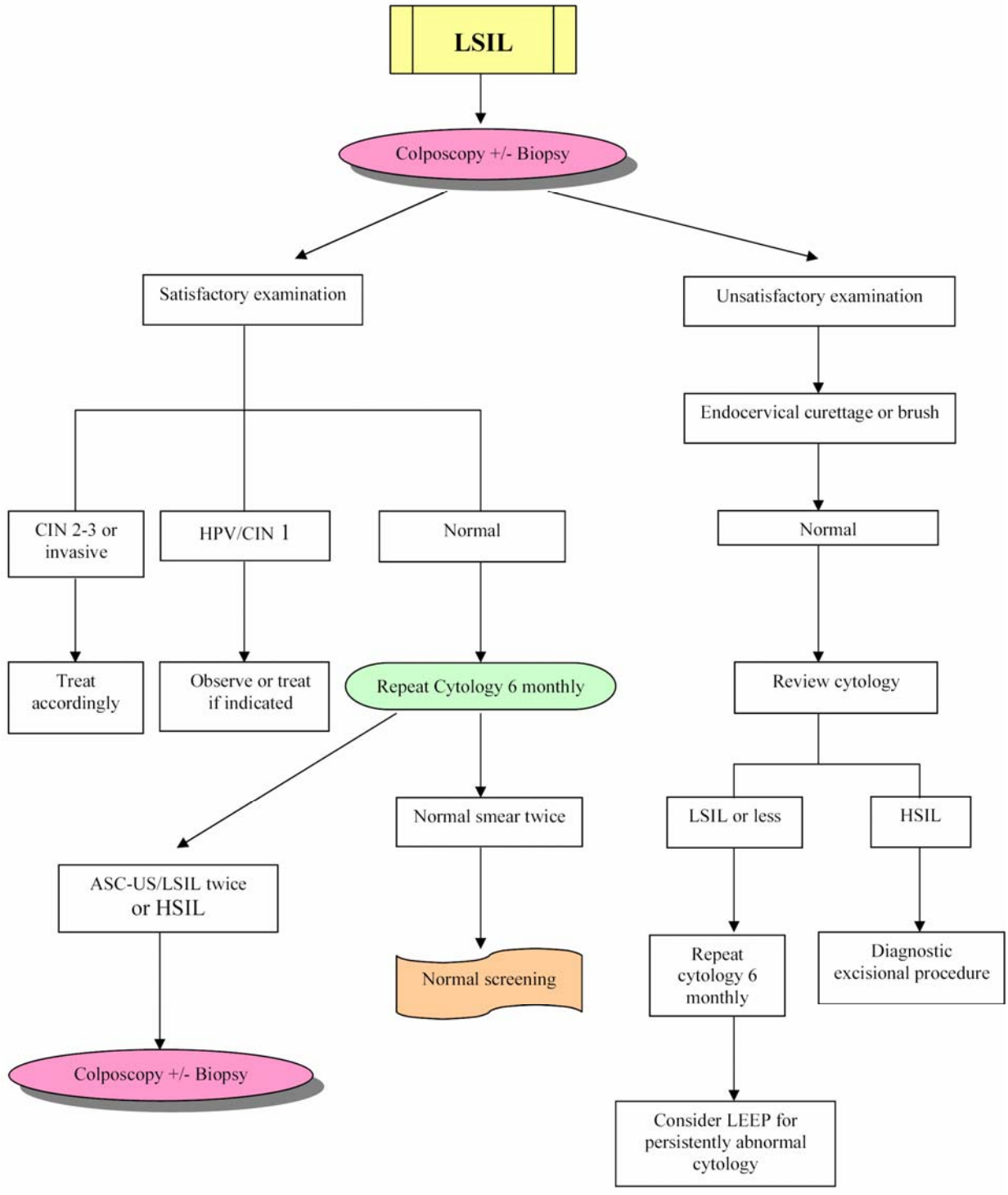
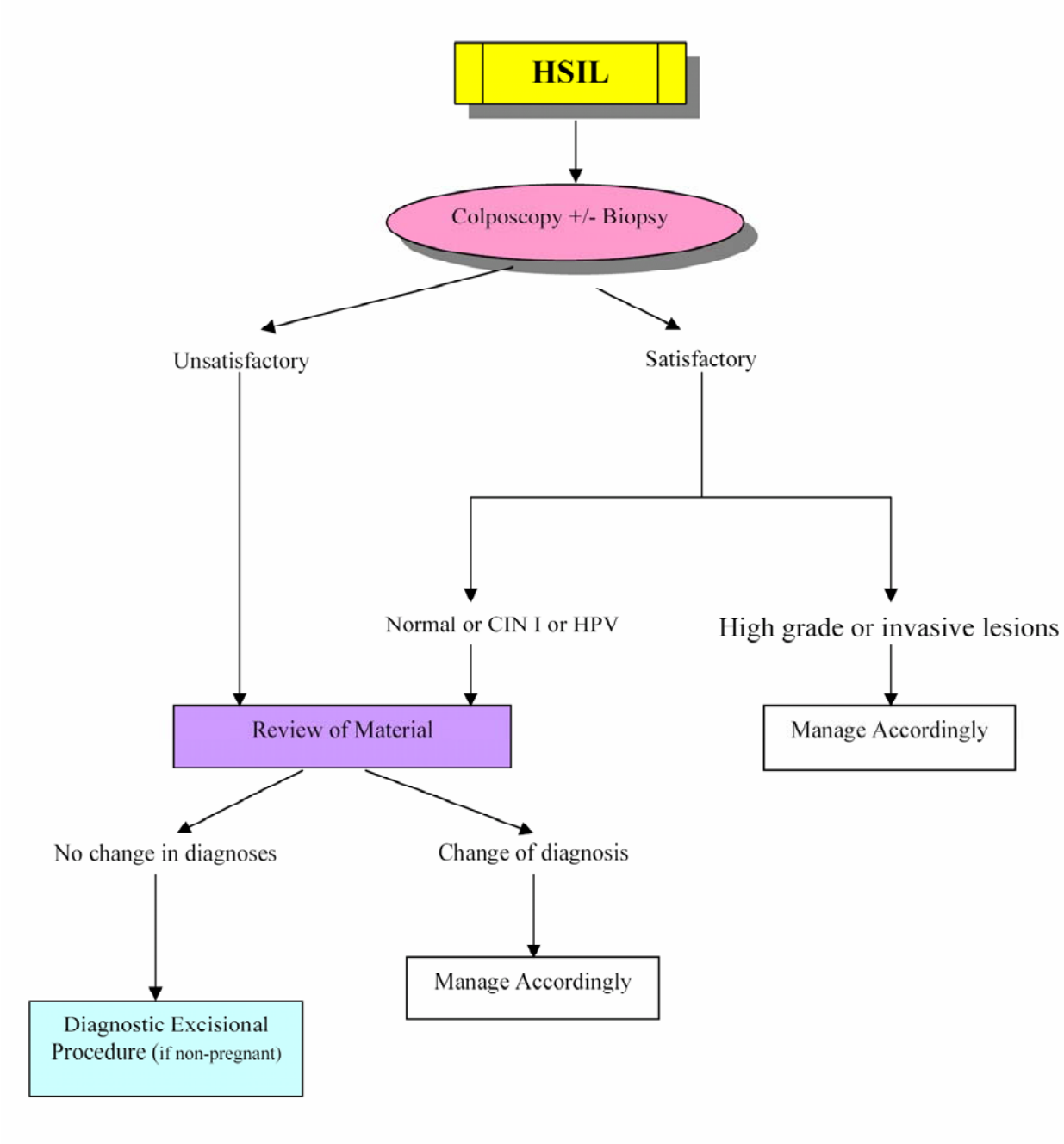


Figure 16 - Management of women with high-grade squamous intraepithelial lesion (HSIL)



After treatment for HSIL, follow-up by cervical cytology for 3 times at 4-6 months interval and then annually for 5 years, then return to routine screening interval.

Figure 17 - Management of women with smears showing invasive squamous cells

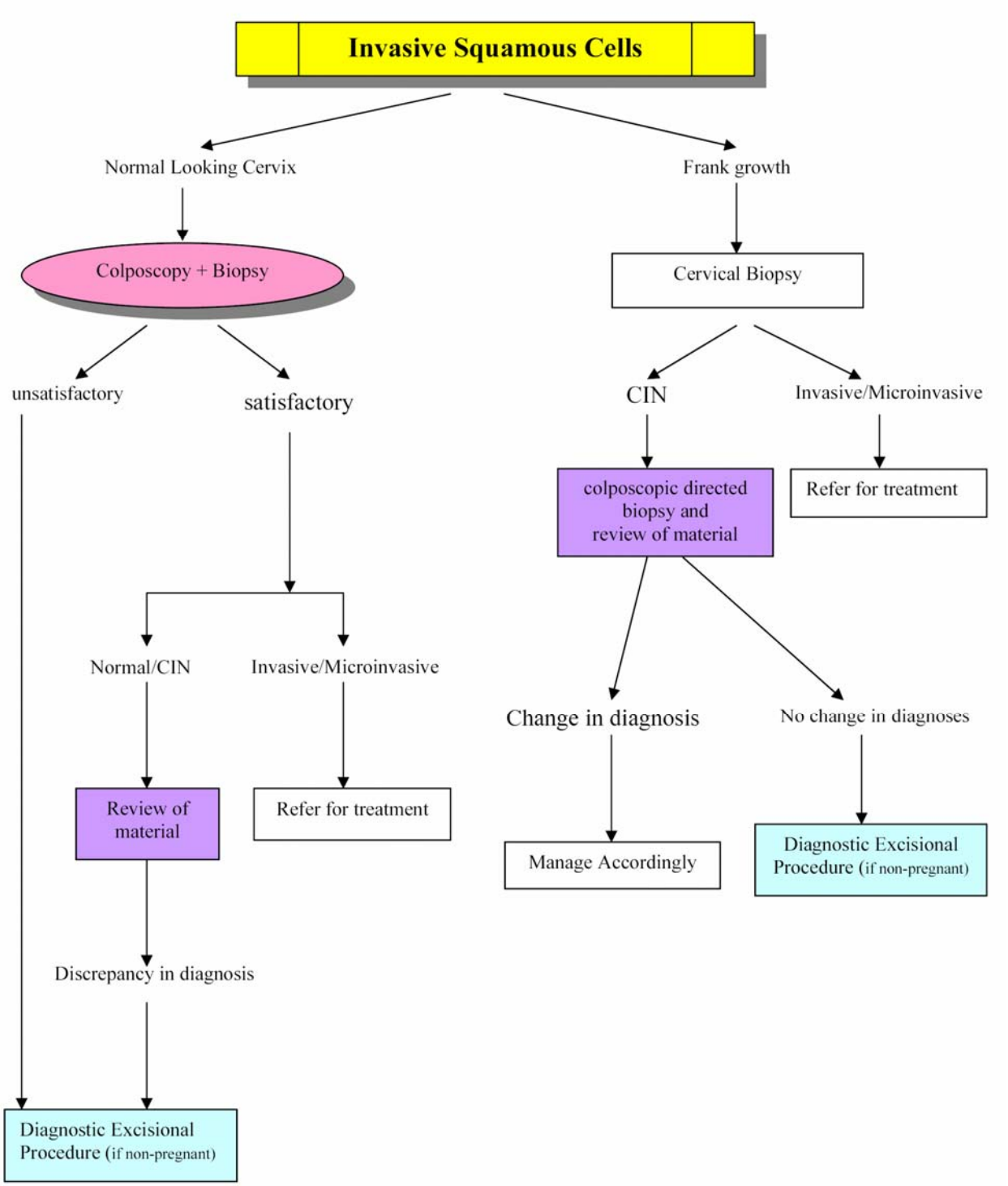
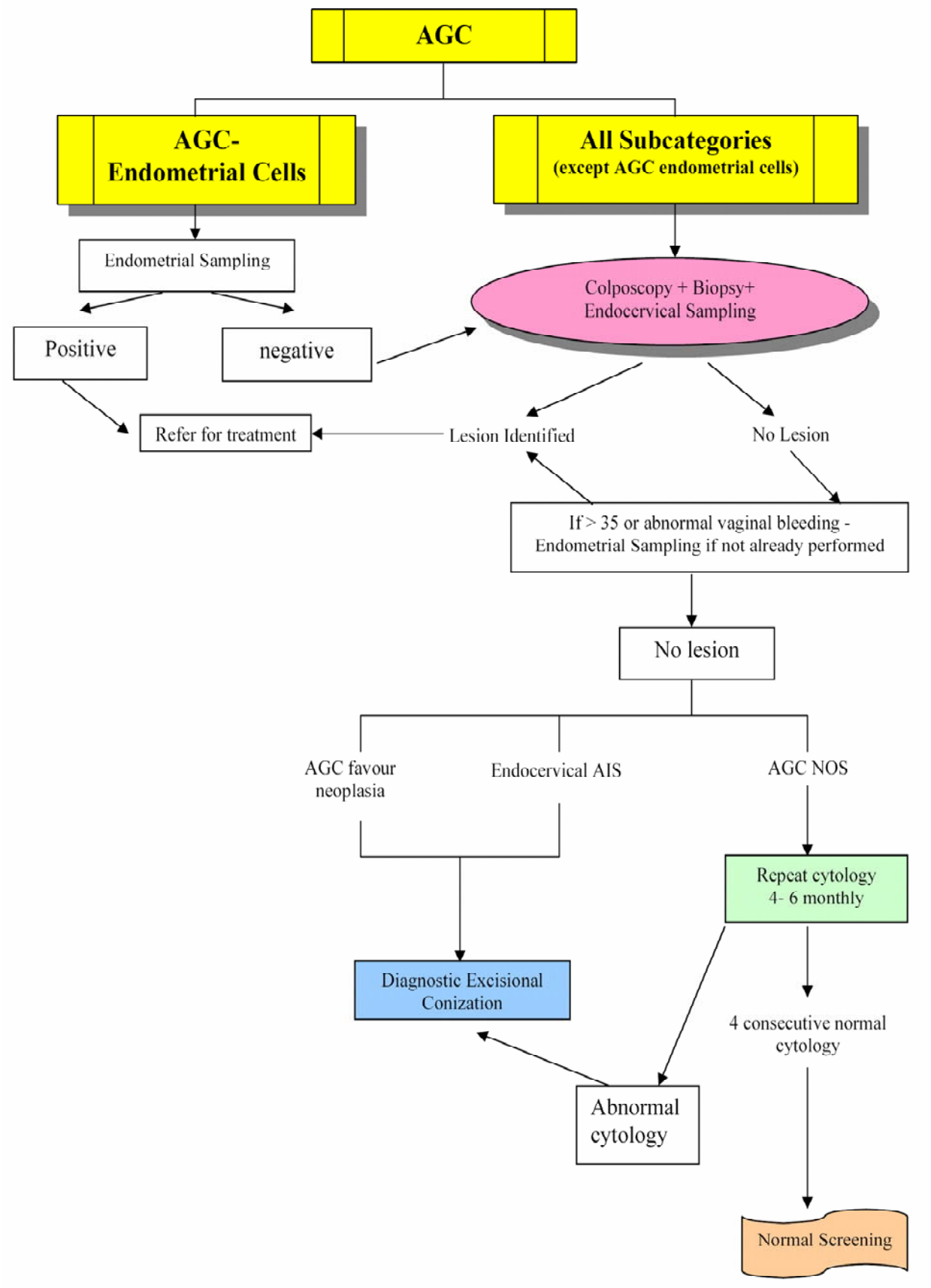


Figure 18 - Management of women with squamous smears showing atypical glandular cells



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14. Hong Kong College of Obstetricians & Gynaecologists. *Guidelines on the management of abnormal cervical smear.* www.hkcog.org.hk.

Resources

1. Department of Health Cervical Screening Programme website

   www.cervicalscreening.gov.hk

2. Hong Kong College of Obstetricians and Gynaecologists

   http://www.hkcog.org.hk

   (a) Management of Abnormal Cervical Smear Revised (2002) - Hong Kong College of Obstetricians and Gynaecologists

   http://hkcog.obg.cuhk.edu.hk/docs/college_guidelines/Management%20of%20Abnormal%20Cervical%20Smear%20Revised_2002.pdf

   (b) Colposcopy Service Provision and Standard - Hong Kong College of Obstetricians and Gynaecologists and the Hong Kong Society for Colposcopy and Cervical Pathology

   http://www.hkcog.org.hk/docs/training/colposcopy/co1.pdf

3. Hong Kong College of Pathologists

   http://www.hkcpath.org/

4. Hong Kong Society of Cytology

   http://www.cytology.org.hk

   (a) Cervical Cytology Practice Guidelines

   http://www.cytology.org.hk/Download/Final%20Draft2.pdf

5. Hong Kong Society for Colposcopy and Cervical Pathology

   http://www.hksccp.org.hk/

6. National Cancer Institute (United States)

   http://www.nci.nih.gov/

7. U.S. Preventive Services Task Force

   http://www.ahcpr.gov/clinic/uspstf/uspscerv.htm

8. NHS Cancer Screening Programmes (United Kingdom)

   http://www.cancerscreening.nhs.uk/cervical/index.html

9. National Cervical Screening Program (Australia)

   http://www.cervicalscreen.health.gov.au/home/index.html

10. Canadian Task Force on Preventive Health Care

    http://www.ctfphc.org/

Acknowledgement

The authors wish to express our gratitude to the following parties for their kind support and contribution to the production of this manual.

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