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Health Service Executive

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24th of August 2018

Ms. Margaret Falsey,
Committee Secretariat,
Committee of Public Accounts,
Leinster House,
Dublin 2.

Re:* follow-*up item from PAC meeting of June 14th 2018

Dear Ms. Falsey,

I refer to correspondence from the Committee to Mr. John Connaghan, Acting Director General in respect of follow-up issue from our attendance at the Committee on Thursday 14th of June 2018. I.e.: letter (PAC32-I-968) dated 19th of June 2018 regarding **item 3** on the aforementioned letter. Note: items 1, 2 & 4 were addressed in my previous correspondence dated 21st of June 2018.

3. A copy of any records relating to the quality assurance visits to include minutes of discussions and final reports submitted following the visits.

The process for quality assurance of contracted laboratories is detailed in the CervicalCheck Guidelines for quality assurance in cervical screening (attached). All laboratories are required to have and retain their accreditation status. In addition a number of Key Performance Indicators are monitored via quarterly statistical returns and include turnaround times, percentile reporting rates, screener sensitivity rates, workloads and EQA compliance. Positive Predictive Values and Referral Values are calculated and published on an annual basis in the CervicalCheck annual report.

As required, a physical audit of lab facilities, records and procedures is carried out in conjunction with the quality department and an external expert reviewer. Interim inspections are carried out where deemed necessary. To date formal inspections (with independent expert reviewer) were carried out in 2011 and again in 2014. It was envisaged that following implementation of HPV primary screening and accompanying laboratory reconfiguration the laboratories would be inspected via a scheduled formal audit process. From 2014 onwards the aforementioned Key Performance Indicators continue to be

monitored via quarterly statistical returns and Positive Predictive Values and Referral Values are calculated and continue to be published on an annual basis in the CervicalCheck annual report.

The Quality Assurance reports included (also attached) are:

1. NSS Coombe QA visit – March 2014
2. NSS Coombe QA Visit – August 2013
3. NCSS CPL (Clinical Pathology Laboratory- Texas) QA visit – May 2011
4. NSS MLP (Medlab Pathology) QA visit- March 2012
5. NSS visit MLP (Medlab Pathology) QA visit - March 2014
6. NCSS visit Quest Teterboro QA visit - May 2011
7. NSS visit Quest Teterboro QA visit - March 2014

Action plans were developed by the laboratories to address findings and these were regularly reviewed.

Actions were addressed and closed as part of the ongoing QA process.

If any further information is required please do not hesitate to contact me.

Yours sincerely,

Ray Mitchell

Ray Mitchell
Assistant National Director
Parliamentary Affairs Division

CervicalCheck
THE NATIONAL CERVICAL SCREENING PROGRAMME

National Cancer Screening Service

Guidelines for

Quality Assurance in Cervical Screening

Second Edition

CervicalCheck
THE NATIONAL CERVICAL SCREENING PROGRAMME

National Cancer Screening Service

Guidelines for

Quality Assurance in Cervical Screening

Second Edition

Contents

Foreword

The National Cancer Screening Service (NCSS) is part of the Health Service Executive (HSE) National Cancer Control Programme. The NCSS has significant experience in developing, implementing and delivering organised, population-based screening programmes.

The NCSS encompasses BreastCheck – The National Breast Screening Programme, CervicalCheck – The National Cervical Screening Programme, BowelScreen – The National Bowel Screening Programme and Diabetic RetinaScreen – The National Diabetic Retinal Screening Programme. When all four programmes are fully implemented, over two million people in Ireland will be eligible for at least one screening programme.

CervicalCheck was introduced in September 2008. At time of publication, the programme had completed its first five year round of screening and provided over 1.65 million smear tests to more than 900,000 women of all ages. Among those women screened in the first four years, 13,117 had pre-cancerous abnormalities detected and 464 cancers were detected.

Cervical screening is a preventative health measure. The primary objective of cervical screening is to reduce the mortality from cervical cancer by detecting and treating changes in the cells of the cervix, before they become cancer.

CervicalCheck provides free regular smear tests to over 1.1 million eligible women aged 25-60 every three or five years (depending on age). Over time, a successful national cervical screening programme in Ireland has the potential to significantly reduce mortality rates in the screened population by as much as 80 per cent. CervicalCheck has a minimum target participation rate of 80 per cent of eligible women.

No screening test is 100 per cent accurate. The value of a population-based screening programme, such as CervicalCheck, is in the repeat nature of the test.

Some women will remain part of the CervicalCheck programme for 35 years and can have 11 or more smear tests during this time. It is essential that these women remain confident in the service that CervicalCheck provides. Quality assurance is at the heart of the programme and dictates every aspect of the screening journey.

The 'Guidelines for Quality Assurance in Cervical Screening (second edition)' is the result of a collaborative process encompassing the entire screening pathway – programme operation, primary care, cytopathology, HPV testing, colposcopy and histopathology. Rigorous adherence to, and continuous monitoring of the quality assurance requirements and standards outlined in this document are vital, and the cornerstone on which the programme is built.

Quality assurance is a continuous process. This document builds on the standards set in the first edition and reflects programme developments such as the introduction of HPV testing post-treatment at colposcopy.

We would like to thank all involved in developing these quality assurance requirements and standards for their time, expertise and commitment to delivering an internationally recognised cervical screening programme in Ireland. In particular, we thank the many thousands of women who have participated in, and supported the CervicalCheck programme since it commenced. Their continuing participation ensures the establishment of cervical screening as a routine feature of women's healthcare in Ireland and in essence, the programme's effectiveness.

Dr Susan O'Reilly

Director, National Cancer Control Programme

Ms Majella Byrne

Head of the National Cancer Screening Service

Preface

The National Cancer Screening Service (NCSS) Quality Assurance (QA) Committee for Cervical Screening was established to develop and monitor quality assurance as part of CervicalCheck – The National Cervical Screening Programme. The committee is responsible for reviewing international standards, recommending best practice, monitoring and evaluating achievement of the recommended standards and their adherence by service providers.

Regular cervical screening can reduce cervical cancer mortality. This is the goal of the CervicalCheck programme. While it is an ambitious goal, it is achievable. Quality assured screening, detection and treatment have ensured these women have been given the highest possible level of care. Continuing adherence to, and development of quality assured care will enable CervicalCheck to achieve its goal into the future.

This second edition of 'Guidelines for Quality Assurance in Cervical Screening' has been developed to support and measure the programme as it establishes itself as a vital and integral element of the healthcare landscape in Ireland.

A set of quality assurance requirements and standards are presented for each element of the programme. Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

There are over 1.1 million women aged 25-60 in Ireland who are eligible for the CervicalCheck programme. It is incumbent upon all involved in delivering the programme to adhere to the requirements and standards outlined.

Mr Simon Kelly

Chairperson of the NCSS Quality Assurance Committee for Cervical Screening

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Acknowledgements

Staff and representatives of service providers to CervicalCheck – including GP Practices, Cytopathology and HPV Testing Laboratories, Colposcopy Services and Histopathology Laboratories – who provided information, data and suggestions in support of the development and drafting of the second edition of the quality requirements and standards.

Chapter 1

Introduction

1.1 Cervical screening in Ireland

1.1.1 Cervical cancer burden in Ireland

The National Cancer Registry Ireland (NCRI) reports that between 2008 and 2010, on average there were 308 cases of cervical cancer per year and 88 recorded deaths in 2010[1]. The median age at diagnosis was 44 years between 2008 and 2010 and median age at death was 58 in 2010.

1.1.2 Cervical screening

Screening is a means of detecting disease before it has developed to the point where it results in symptoms. It can allow detection of cancers at an early stage of invasiveness, or even before they become invasive. Screening aims to improve survival, limit morbidity and to improve the quality of life of those who have developed cancer.

Screening is different from most other forms of healthcare and there is often uncertainty about its purpose. Screening does not diagnose illness; its purpose is risk reduction. It is not a guarantee of diagnosis and cure. Those who have a positive screening test require confirmatory diagnostic testing before definitive diagnoses can be established and appropriate treatment planned.

Cervical cancer screening is a preventative health measure as smear tests can detect early changes in the cells of the cervix. The earlier a change is found the easier it is to treat.

Cytological screening at the population level every three to five years can reduce cervical cancer mortality by up to 80 per cent (IARC, 2004)[2]. Such benefits can only be achieved if quality is optimal at every step in the screening process, from demographic information and invitation of the eligible population, to performance of the screening test and follow-up, and if necessary, treatment of women with screen-detected abnormalities[2].

1.1.3 Background to cervical screening in Ireland

1996	Report of the Department of Health Cervical Screening Committee[3] published, setting out the parameters for a national cervical screening programme.
1997	Minister for Health made the decision to establish a national cervical screening programme.
2000	The Irish Cervical Screening Programme (ICSP) Phase One was established as a pilot cervical screening programme operating in the Mid West region.
2004	External review of the Irish Cervical Screening Programme (ICSP) Phase One made a series of recommendations for implementing a national cervical screening programme.
2006	'A Strategy for Cancer Control in Ireland 2006'[4] from the National Cancer Forum made recommendations in relation to the organisation, governance, quality assurance and accreditation of all aspects of cancer care. It examined prevention, screening, detection, treatment and management of cancer and advocated a comprehensive cancer control policy programme and cancer screening managed by one organisation.
2007	National Cancer Screening Service (NCSS) established by the Minister for Health and Children in January 2007, responsible for the governance of BreastCheck - The National Breast Screening Programme, and of the Irish Cervical Screening Programme (ICSP) Phase One.
2008	CervicalCheck – The National Cervical Screening Programme commenced on 1 September 2008.
2009	'Guidelines for Quality Assurance in Cervical Screening 1st Edition' published by the NCSS.
2010	NCSS subsumed into the Health Service Executive (HSE) within the National Cancer Control Programme (NCCP).
2013	CervicalCheck completed the first 5 years of operation on 31 August 2013.

1.2 CervicalCheck – The National Cervical Screening Programme

The National Cancer Screening Service (NCSS) is part of the HSE National Cancer Control Programme. It encompasses BreastCheck – The National Breast Screening Programme, CervicalCheck – The National Cervical Screening Programme, BowelScreen – The National Bowel Screening Programme and Diabetic RetinaScreen – The National Diabetic Retinal Screening Programme. The NCSS is responsible for the governance of CervicalCheck.

CervicalCheck commenced on 1 September 2008. The programme offers free smear tests to eligible women aged 25-60 (more than 1.1 million women). The screening programme is based in primary care, with more than 4,500 doctors and nurses registered with the programme. CervicalCheck has 15 colposcopy services located throughout the country for investigation, diagnosis and treatment.

1.2.1 Programme goals

Incidence	To reduce the incidence of cervical cancer among the screened population.	35% reduction*

*To be calculated following the completion of two rounds of screening (10 years)

Mortality	To reduce mortality from cervical cancer among the screened population.	50% reduction*

*To be calculated following the completion of two rounds of screening (10 years)

The National Cancer Registry Ireland (NCRI) is the repository of cervical cancer data in Ireland, including statistics on cervical cancer mortality.

There are many factors that will impact on the interpretation of trends in mortality data including treatment advances, quality of death certification and cancer registration. Nonetheless the programme will strive over the long term towards a mortality reduction of 80 per cent.

In pursuit of the achievement of these goals, CervicalCheck has set a principal objective of achieving a significant level of coverage of the eligible population.

Coverage is defined as the proportion of unique women who have had at least one satisfactory smear test taken within the defined screening interval, expressed as a percentage of the total number of eligible women in the population.

A satisfactory smear test is one that is deemed adequate to be screened and where the sample is not damaged, broken or expired.

Coverage of screening population	Women within the defined screening population should have at least one satisfactory smear test within a screening interval.	80%

Coverage is included in the Key Performance Indicators (KPIs) (Appendix 1) for the programme, which are in line with the European guidelines for quality assurance in cervical cancer screening[5].

1.3 Quality assurance

The CervicalCheck quality assurance (QA) framework adopts the principles and quality requirements set out for screening programmes in New Zealand[6]. According to the QA framework developed by the New Zealand Ministry for Health, 'once a screening programme is established, quality assurance and quality improvement activities are essential for ensuring ongoing safety and effectiveness of the programme. Screening programme quality assurance and quality improvement activities occur at all points along the screening programme pathway'[6].

The framework states the aims of quality assurance for a screening programme as:

- Reduce the risk of errors
- Set and reset standards
- Help professionals and organisations improve their performance
- Identify and manage errors effectively and sensitively.

Four dimensions of quality are considered key to fulfilling quality requirements.

Equity and access*	The extent to which people are able to receive a service on the basis of need, mindful of factors such as socioeconomic factors, ethnicity, age, impairment or gender.
Safety	The extent to which harm is kept to a minimum.
Efficiency	The extent to which a service gives the greatest possible benefit for the resources used.
Effectiveness	The extent to which a service achieves an expected and measurable benefit.

*The inclusion of equity and access clearly indicates that attention to the needs of groups with poorer access is an essential part of achieving high quality[6].

Quality assurance of the screening process requires a robust system of programme management and co-ordination, ensuring that all aspects of the service are performing adequately. Attention must be paid not only to communication and technical aspects but also to qualification of personnel, performance monitoring and audit, as well as evaluation of the impact of screening on the burden of the disease[6].

Population-based screening policy and organisation, conforming to evidence-based standards and procedures, provide the overall programme framework essential for the implementation of quality assurance; and are therefore crucial to the success of any cervical cancer screening programme[6].

All cervical screening programmes have false positive and false negative cytology results. The false positive rate and the false negative rate are universally related and measures to reduce one may increase the other. The challenge for those managing screening programmes and the quality assurance of screening is to strike a balance between the false positive rate and the false negative rate.

If the false negative rate is too high the effectiveness of the screening programme will be reduced. It will fail to detect and treat sufficient numbers of women with high grade abnormalities and the incidence of cervical cancer will be higher. If the false positive rate is too high the quality of the programme will be reduced. Large numbers of women will be made unnecessarily anxious and placed at risk from over-treatment by the screening programme.

1.4 Quality assurance as part of the CervicalCheck programme

The CervicalCheck quality assurance (QA) framework adopts the principles and quality requirements set out for screening programmes in New Zealand[6]. For quality-assured screening programmes, seven principles and seven quality requirements are set out.

1.4.1 Principles of the quality assurance framework

People-centred	Screening programmes must be trusted by and serve the needs of individuals and communities by ensuring fair access for all eligible people, safety, effectiveness and efficiency. Individual requirements and community perspectives need to be considered when determining the balance of benefits and harms and the costs of screening programmes.
Continuous improvement	A cycle of ongoing improvement is fostered through: • Systems for individual and programme evaluation and feedback • The development and updating of standards, policies and processes • Ongoing measurement and analysis of processes and services to monitor safety and effectiveness • Publication of the results of such monitoring, and their incorporation into further programme developments
Building the knowledge base	Individuals working within screening programmes are valued and supported to develop, maintain and improve their professional skills. Opportunities for sharing information and learning within and between screening programmes are fostered.
Accountability	Screening programmes clearly define roles and document processes as part of accountability expectations, which should be regularly reviewed and updated.
Bridging the expectation gap	Screening is not well understood by many professionals and the public, which results in a gap between public expectations of screening programmes and what they are able to deliver. Thus, screening programmes need to work to improve understanding of the principles of screening through the development and dissemination of understandable, evidence-based information about the benefits and limitations of screening.
Coherence throughout the programme	Screening programmes are planned, funded, delivered and monitored as population health programmes. Clear, evidence-based approaches are applied across the screening pathway irrespective of the condition being screened for or where they are delivered. Opportunities for learning within and between programmes will facilitate coherence. Quality management systems, including quality assurance activities and audit, should align with other health quality management systems wherever possible. Duplication is avoided through the sharing of information within a programme to minimise resource costs. Co-operative approaches with service providers are sought to minimise compliance costs while still obtaining assurances of quality.

Partnership with programme staff, participants and service providers	Screening programmes require the effort of all stakeholders, particularly those involved in service provision to achieve the desired outcomes. It is important for all involved to have a sense of shared ownership of the screening programme quality goals.

1.4.2 Key quality requirements of the quality assurance framework

Standard setting and monitoring	Standards are the backbone of quality management in screening programmes. A set of written, auditable standards relevant to the specific screening methods and policy should be developed and regularly reviewed.
Performance management	Individual, team, organisation and programme performance should be monitored against agreed processes and outcome indicators through routine audits against programme standards. Specific programme activities should be formally evaluated.
Training and certification	Personnel employed within screening programmes should have relevant competencies. Minimum training levels required to perform specific activities within a screening programme should be specified. In addition, accreditation or certification to carry out specific screening activities may be required. Ongoing education is essential to maintaining and improving quality.
Effective information systems	Effective and efficient information systems are essential as both management tools for screening programmes and as the basis for evaluation and monitoring. Support participants to update their information on the Cervical Screening Register (CSR).
Appropriate resources	Resources for screening programmes, including diagnostic and treatment services, must be appropriate to provide safe, efficient, effective and equitable services for the eligible populations. Resources include personnel, workforce training and development, equipment and facilities. Screening programmes should not be initiated before adequate resources are secured to ensure quality requirements can be met.
Information and communications	Clear, evidence-based information should be widely available and effectively communicated to participants of the screening programme in appropriate formats. The information should be regularly updated. This should facilitate informed consent to the screening test and the full screening pathway, and include appropriate detail for healthcare professionals, other programme staff and people invited to screening. Information should include both benefits and limitations of screening and programme policies and should cater to the needs of different cultural groups.
Risk management	For population-based screening programmes, a quality assurance framework is a critical requirement and must be embedded in any programme from the outset. This should include risk management strategies to minimise the potential harmful effects of screening and follow-up.

1.4.3 Development of the CervicalCheck quality assurance requirements and standards

The National Cancer Screening Service (NCSS) established the Quality Assurance (QA) Committee for Cervical Screening in 2007. The primary function of the NCSS QA Committee is to advise the Head of the NCSS regarding quality assurance and standards for the national cervical screening programme.

The QA committee initially focused on developing quality assurance standards for the planned national cervical screening programme. Three technical subgroups were established, the Primary Care QA Subgroup, the Laboratory QA Subgroup and the Colposcopy and Gynae-Oncology QA Subgroup. The 'Guidelines for Quality Assurance in Cervical Screening, 'First Edition', were approved and published in 2009.

The standards were based on a woman's journey as she moves through different parts of the cervical screening pathway. They were designed to support the service providers to the CervicalCheck programme and to provide a means to monitor and continually improve services. The standards covered every aspect of the screening pathway, from identification of the eligible population, through screening, diagnosis and treatment, to programme monitoring and evaluation.

Following publication of the first edition of the standards, the QA Committee for Cervical Screening was re-organised as a single-tier committee, comprising representatives from the clinical areas of the cervical screening pathway – primary care, cytopathology, colposcopy, histopathology – and from programme management and clinical direction.

Following the completion of the first five years of operation in August 2013, the QA committee determined that it was timely to review the 'Guidelines for Quality Assurance in Cervical Screening'. The reasons for undertaking the review of the standards included:

- Feedback from stakeholders in relation to the first edition of standards
- The significant quantity of data that had been assembled, arising from the operation of the screening programme for over 5 years
- Monitoring outcomes of programme activity and performance
- Experience gained in the various components of programme delivery
- Developments in cervical screening, particularly in relation to the use of HPV testing technology.

1.4.4 Statement of the quality assurance requirements and standards

The quality assurance (QA) standards and requirements are grouped under the principal components of the cervical screening pathway – programme operation, primary care/smeartaking, cytopathology, HPV testing, colposcopy and histopathology.

The grouping permits service providers to readily assess the most relevant requirements for their roles within the screening programme. Care has been taken to address the links between the components in the pathway, including the quality of communications between components, to ensure that a woman's care is effectively managed.

Where applicable, the QA standards and requirements draw upon the 'European guidelines for quality assurance in cervical cancer screening'[5].

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Stakeholders are expected to be able to demonstrate how they fulfil quality requirements. The means of demonstration may include, as examples, certification, accreditation, external audit or self audit.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

The targets set are those judged to be achievable by service providers when operating effectively and efficiently. Where appropriate, a minimum level is also stated. Service providers should not fall below this level of outcome.

1.4.5 Monitoring and evaluation

Standards drive specific datasets that must be collected in order to monitor the performance of each element of the cervical screening programme. Data collection, analysis and programme reporting is primarily carried out by the Programme Evaluation Unit (PEU) of the NCSS.

Data is obtained from, among other sources:

- Cervical Screening Register (CSR)
- Databases for smeartaker registration, training and education
- Activity and outcome reports and quality metrics from cytopathology laboratories
- Activity and outcome reports and quality metrics from colposcopy services
- Activity and outcome reports and quality metrics from histopathology laboratories
- Activity and transaction logs from the programme office and its quality management system (QMS).

Screening programme evaluation is distinguished from quality assurance and quality improvement activities. Evaluation involves monitoring and assessing the service delivery and outcomes of a screening programme, which may include assessing overall programme effectiveness, cost effectiveness and acceptability. Evaluation will determine whether the programme is actually delivering on its objectives. In contrast, quality improvement activities are concerned with maximising the likelihood that the day-to-day operation of the programme will deliver the expected outcomes[6].

1.5 References

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Chapter 2

Quality assurance in programme operation

2.1 Introduction

Programme operation includes:

- The definition of the screening population and of the recommended screening intervals
- Processes for the identification of eligible women
- An organised process of communication with eligible women
- The means of enabling access and participation by eligible women
- Acquiring and maintaining the screening history of eligible women over time
- Processes to ensure that women are followed-up based on management recommendations
- Reporting and performance monitoring
- Programme evaluation.

CervicalCheck requires quality assurance in programme operation as one element of the cervical screening pathway.

2.2 Quality assurance requirements and standards

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

2.2.1 Screening population and screening intervals

Quality requirement

Screening population

The programme shall make publicly available at all times the defined screening age range in operation, together with definitions of any women outside of this age range that are deemed eligible for programme screening in specific circumstances.

Quality requirement

Screening intervals

The programme shall make publicly available at all times the defined screening intervals, with the associated qualifying attributes (e.g. age, previously unscreened, post-colposcopy) that are in operation.

2.2.2 Identification and recording of screening population

The Health (Provision of Information) Act 1997[1] provides the legislative framework for the acquisition and retention of the demographic details of eligible women for the purposes of delivering an organised screening programme.

Quality requirement

Creation of a register

The programme shall establish and maintain a secure database (known as the Cervical Screening Register (CSR)) to contain individual records for each woman in the screening programme. The CSR is designed to support the accurate identification and appropriate management of women throughout their participation in the programme.

Quality requirement

Acquisition and update of demographic details

Processes shall be in place to acquire, maintain and update the demographic details of eligible women on the CSR.

Quality requirement

Unique identification of women

Each woman with a record on the CSR must be assigned a unique identifier number within the cervical screening programme.

Quality requirement

Minimum demographics

Each woman's record on the CSR must contain forename, surname, date of birth, address and unique cervical screening programme identification (CSP ID).

Standard 2-1

Eligible population register

The CSR must contain the minimum demographics for the eligible women within the population.	95% of Census Min: 90%

Note: The number of eligible women on the CSR versus the number published in the Central Statistics Office (CSO) census.

Standard 2-2

Matching demographics

The demographic details for each woman should include at least one of the following elements: surname at birth, mother's maiden name or PPS number.	Achievable: 95% Min: 90%

Note: Matching demographics are not subject to change in a woman's lifetime and are in addition to the minimum demographics.

Standard 2-3

Data protection and confidentiality

The programme (under the relevant Health Authority) shall be registered with the Data Protection Commissioner and comply with directives regarding the use and security of personal information, subject to the provisions of the Data Protection Act 1988[2], Data Protection (Amendment) Act 2003[3] and any future revisions or amendments of the Act as well as the EU Directive 95/46/EC - The Data Protection Directive[4].	Annual

Note: The acquisition and use of personal health information is for the purpose of implementing the cervical screening programme.

The following principles guide the use of data held on the CSR:

- One woman with one set of demographics
- Personal health information belongs to the woman to whom it relates
- Women give consent at the time of their initial smear test to allow CervicalCheck to hold and share their personal and screening data
- Security and confidentiality
- CervicalCheck will act to minimise the risk to women.

Quality requirement

Prevention of loss of data

Systems shall be in place for regular back-ups and secure storage of the personal health information and related data held by the programme.

2.2.3 Call, re-call process

Call, re-call history: The Cervical Screening Register (CSR) will be capable of recording a woman's call, re-call history.

The CSR is used to control the issuing of programme letters, including:

- Invitation (call) letters that invite women to participate in the programme by attending a smear test with a registered smeartaker
- Re-call letters that invite previously screened women to attend for another smear test at defined intervals
- Letters following cytology results which advise women of their next recommended step in the screening programme
- Letters and forms to women and their doctors to ensure appropriate follow-up of women with abnormal cytology results.

Standard 2-4

Invitation (call) of eligible women

Every eligible unscreened woman with a record on the CSR should be invited (called) within a reasonable period of having her record first created on the CSR.	100% within 1 year. Min: 90%

Standard 2-5

Re-call of previously screened women

All previously screened women with re-call recommendations (routine or annual) should be issued a re-call letter in advance of the appropriate smear test due date.	100% at least 2 months in advance of due date. Min: 90%

Note: For previously screened women, the re-call smear test interval is typically one year (increased surveillance), or three or five years (routine screening). This depends on the woman's age and the management recommendation associated with her previous cytology result. The programme must have a system to notify these women in advance of the re-call smear test due date. Women with a three month or six month repeat recommendation are not issued a letter. These women are excluded from the standard.

Standard 2-6

Reminders

Women who do not respond to an invitation (call) or re-call letter by attending for a smear test within a specified period are sent at least one reminder letter.	100% within 3 months of first letter. Min: 90%

Quality requirement

Women who choose not to participate

An opt-off process should be provided for women who choose not to participate in CervicalCheck. Women can opt-off directly or in some cases the medical practioner may deem it appropriate to opt-off a woman.

Standard 2-7

Opt-off

CervicalCheck should not issue letters to women who choose to opt-off.	100%

Note 1: Women who inform the programme in writing of their wish to opt-off should not be included in any future call, re-call process. The aim is to provide women with the option and to support women for whom screening is not appropriate, for whatever reason, to choose to withhold or withdraw consent from any future participation in the programme. Women can re-enter the programme at any stage by signing the consent form and having a smear test.

Note 2: A medical practitioner can opt-off a woman who is deemed not to require cervical screening e.g. they do not have the capacity to consent, it is not physically possible for the woman to have a smear test or the woman is terminally ill.

Standard 2-8

Accuracy of addresses for correspondence

Demographic details of women on the CSR should be accurate and updated as necessary.	< 10% of invitation or re-call letters returned. < 2% of result and follow-up letters returned.

Note : This is measured by the proportion of issued letters that are returned as undeliverable by the postal system. Follow-up letters include letters following smear test results and abnormal follow-up letters.

The limitations defined for this standard are:

- Some letters will never be returned
- Calls are received to the programme to change address
- Can only be calculated on a yearly basis as an indication.

2.2.4 Screening history of women

Quality requirement

Screening history

The Cervical Screening Register (CSR) should be capable of recording a woman's screening history.

A woman's cervical screening history may include some or all of her cytology results, HPV test results, management recommendations, colposcopy attendances, procedures and discharges, and biopsy results.

Quality requirement

Informed consent

Data related to a woman's screening history should only be acquired when the woman has provided her informed consent.

A woman's consent allows her screening history on the CSR to be shared with third-party service providers including cytology and histology laboratories and colposcopy services to inform decision-making regarding management of the woman's care.

Quality requirement

Transfer of personal health information

All personal health information transferred between the CSR and third-party service providers engaged to support programme delivery should use secure communications methods, and/or must be encrypted to an accepted standard or protocol. Secure electronic communications methods should include Virtual Private Networks (VPNs) and secure email.

Standard 2-9

Matching of screening events to the correct woman

Screening event details including cytology and HPV, colposcopy and histology results, notified to the programme must be matched to the correct woman's record on the CSR.	Achievable: 99% Min: 97%

Standard 2-10

Duplicates and merges

There must be processes in place to identify women with more than one record on the CSR, and to merge the records to a single record.	< 1% of records at any one time. Min: < 5%

2.2.5 Registration of smeartakers

Quality requirement

Registration of health professionals as smeartakers

The programme should have a system of engaging qualified doctors and nurses in primary care settings as identified smeartakers for the screening programme.

Quality requirement

Information about programme smeartakers

The programme should make the contact details and locations of registered smeartakers publicly available through appropriate channels to eligible women.

2.2.6. Communications with women

Quality requirement

Commitment to women

The programme should develop and make publicly available its commitments to women through the publication of a Client Charter[5].

Quality requirement

Provision of relevant information to women

The programme should develop and provide information in appropriate formats to facilitate women, including women with special requirements, to make informed choices in relation to their participation in the programme. Information materials for women will be reviewed to reflect policy changes and users' needs on a periodic basis. Reviews will consider materials for appropriateness, accuracy and clarity of content, means of dissemination, and new information to be incorporated.

Channels for the provision of information may include advertisements, promotional materials, information leaflets in appropriate locations, website and by direct contact (telephone, email, post).

Quality requirement

Appropriate correspondence to women

Information leaflets should accompany invitation (call) letters and letters following results to inform women about the screening programme and the recommended follow-up steps to be taken. The correct information leaflet should accompany invitation (call) letters and letters following results.

Quality requirement

Registration and eligibility

The programme should provide the means for women to register, check if they are registered, update their registration details, and check their eligibility for a programme smear test through appropriate means, including telephone, email, post and website.

Quality requirement

Women with special requirements

The programme should have an access officer and procedures in place to support access and participation by eligible women with special requirements. The programme will provide appropriate literature to support women with special requirements.

Quality requirement

Feedback from women

The programme should provide suitable channels for women to provide feedback regarding all aspects of their experience with the screening programme. A process for recording and evaluating feedback will be provided.

Feedback channels should include telephone, email, post, website (initiated by women), surveys, forums and screening promotion reports (initiated by the programme).

2.2.7 Management recommendations and follow-up

Quality requirement

Standard management recommendations

The programme should provide smeartakers with reports (through designated laboratory services and colposcopy services) containing cytology results with associated management recommendations for the follow-up of women after smear tests.

Standard 2-11

Programme communication with women following smear tests Letters should be issued to women advising them of the next recommended step in the screening programme as soon as possible following receipt of the cytology smear test result from the laboratory.	95% within 4 working days of receipt of the cytology result. Min: 80%

Note: The woman's next recommended step in the screening programme is based on the management recommendation accompanying her smear test result, or the discharge recommendation from colposcopy.

Standard 2-12

Programme response time

Letters should be issued from the programme to women advising them of the next recommended step in the screening programme within a timely period from the date of their smear test.	90% within 4 weeks. Min: 75%

Quality requirement

Abnormal follow-up (failsafe) process

A process should be in place to monitor women with abnormal smear test results and women who have been discharged post-colposcopy. The programme will communicate with the woman and doctors concerned in the event of no evidence of subsequent recommended action.

Standard 2-13

Abnormal follow-up (failsafe) communications

Forms and letters should be issued in a timely manner to women and to clinically responsible doctors where the recommended next step in the screening programme has not been taken.	100% within 3 months of due date. Min: 90%

Note 1: The abnormal follow-up process involves communications sent by the programme to the woman and to the doctor with clinical responsibility when the woman does not attend for her recommended repeat smear test (following an inadequate or 'abnormal' result), her recommended referral to colposcopy or her recommended post-colposcopy discharge smear test.

Note 2: The follow-up actions are designed to ensure that all reasonable steps are taken to ensure screening results have been communicated to a woman and her clinically responsible doctor and that she has been offered a repeat smear test or further investigation as appropriate.

Standard 2-14

Abnormal follow-up (failsafe) outcomes

Women with abnormal smear test results should have either subsequent, appropriate action (smear test or colposcopy attendance) or follow-up information from a clinically responsible doctor recorded.	Achievable: 98% Min: 95%

Note: A 'lost-to-follow-up' report, identifying all women for whom no subsequent recommended actions have been notified should be prepared by the programme each year.

2.2.8 Quality assurance monitoring

Quality requirement

Quality assurance standards

Quality assurance requirements and standards for all aspects of the cervical screening pathway should be developed, published and made available to all service providers and stakeholders.

Standard 2-15

Review of quality standards

Quality assurance standards will be reviewed, updated and published at regular intervals.	At least once every 5 years.

Quality requirement

Monitoring of service provision

Processes should be in place to measure and monitor the overall programme performance and the performance of service providers against requirements and standards on an ongoing basis. Planning, corrective actions and preventive actions should be in place to address failures to meet quality requirements and standards, and service or contract requirements.

Standard 2-16

Quality management system

Programme administration should operate a quality management system (QMS) that is certified by an approved certification or accreditation body.	External review annually and recertification every 3 years.

Note: The QMS must encompass a quality policy, quality manual, control of documents, and control of records. The QMS must also incorporate procedures for handling complaints, non-conformances with service providers, feedback from women and stakeholders, and management of measures for continuous improvement.

Quality requirement

Cervical cancer review

A documented process should be in operation to enable the recording and review of identified cases of invasive cervical cancer in order to contribute to quality improvement.

Standard 2-17

Cervical cancer review

Identified cases should be reviewed on an ongoing basis.	Achievable: Quarterly Min: At least once every 6 months.

2.2.9. Programme reporting and evaluation

Standard 2-18	**Programme activity and outcomes**	
	A report of programme activity and outcomes should be prepared at regular intervals.	Annually Min: 18 months

The 'European guidelines for quality assurance in cervical cancer screening'[6] describe the key performance indicators (KPIs) for a cervical screening programme.

KPIs provide an indirect evaluation of the impact of the screening programme and act by monitoring the screening process. They enable the programme to identify and respond to potential problems at an early stage. The indicators also examine aspects of the programme that in addition to influencing the impact of the programme, address the human and financial costs of screening.

Three distinct groups of indicators are used:

- Screening intensity
- Screening test performance
- Diagnostic assessment.

Appendix 1 provides a list of the KPIs, grouped within these categories.

Standard 2-19	**Programme key performance indicators (KPIs)**	
	KPIs for the cervical screening programme must be calculated and made available.	Every 5 years.

2.3 References

1. The Health (Provision of Information) Act 1997. Number 9 of 1997.
2. Data Protection Act 1988. Number 25 of 1988.
3. Data Protection (Amendment) Act 2003. Number 6 of 2003.
4. EU Directive 95/46/EC - The Data Protection Directive. Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.
5. CervicalCheck – The National Cervical Screening Programme Women's Charter (CS/PUB/CC-5).
6. Arbyn M., Antilla A., Jordan J., Ronco G., Schenck U., Segan N., Wiener H.G., Herbert A., Daniel J., von Karsa L. (2008) European guidelines for quality assurance in cervical cancer screening [2nd Edition]. International Agency for Cancer Research and EU, Health & Consumer protection Directorate-General.

Chapter 3

Quality assurance in primary care

3.1 Introduction

Primary care plays a pivotal role in ensuring the overall success of CervicalCheck as it is where the vast majority of smear tests are carried out. The role of health professionals in providing a quality service in cervical screening to women is dynamic.

In addition to carrying out the smeartaking procedure and ensuring results are followed-up, health professionals in primary care play a vital role in the promotion of cervical screening and in the communication of key messages to support women's knowledge in this area.

The overall aim of the process of care is to ensure that women receive the personal care that is required in a sensitive, appropriate and timely manner with due regard to safety, comfort and dignity throughout the screening process.

These guidelines provide a framework to assist smeartakers to deliver a quality service. The quality requirements and standards mirror the woman's journey through the cervical screening process in primary care. They are important, achievable and take into account the evidence available at the time of statement. They address the most critical aspects in the screening pathway from a quality perspective.

Practices and clinics in primary care should be able to demonstrate how they meet the quality requirements and standards via self audit. The programme can assist in assessing compliance with several of the stated standards and their associated targets by providing statistics derived from data on the Cervical Screening Register (CSR).

3.2 Non-primary care settings

There will be circumstances where it may be appropriate to have screening undertaken in public gynaecology, colposcopy or sexually transmitted infection (STI)/genitourinary medicine (GUM) services. These services have their own clinical and organisational models and frameworks for service provision.

The quality assurance (QA) requirements and standards for primary care apply equally to all services supporting the CervicalCheck programme. They address the many facets of the smeartaking process including engaging with women, promoting the benefits of screening, smeartaking, management of results and the appropriate follow-up.

3.3 Quality assurance requirements and standards in primary care

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

3.3.1. Promoting awareness and benefits of cervical screening

Primary care has a pivotal role in identifying and encouraging women to participate in regular screening. The Cervical Screening Register (CSR) information system is constantly updated to create records for women as they become eligible. As data on the CSR may not be complete or accurate, every effort must be made to identify and include all eligible women. Eligible women attending a practice or clinic should be included on the CSR.

Quality requirement

Promoting awareness and benefits of cervical screening

Practices and clinics should have current CervicalCheck signage on display and current CervicalCheck information leaflets available for women who attend.

Quality requirement

Registration and eligibility of women

Practices and clinics should ensure that an eligible woman is made aware of her options to register so that she is included on the CSR.

A letter of invitation is not required for a CervicalCheck smear test. The first CervicalCheck smear test will automatically register the woman. Practice staff should encourage a woman to self-register if she is not yet part of the CervicalCheck programme. Practice staff can register women with the programme if appropriate i.e. if she is not having a smear test on that day.

Quality requirement

Understanding cervical screening programme operation

All practice and clinic staff should be provided with updates in relation to the cervical screening programme and their role in supporting it.

Practice administration staff should ensure that information they give to women is accurate and in a format that is easily understood. A woman may choose a smeartaker in another practice. A woman may request a female smeartaker or choose to change smeartaker.

Quality requirement

Addressing barriers to participation

Practice and clinic staff (clinical and administrative) should be aware of the barriers to participation by eligible women in cervical screening, and of the means to minimise them.

Recognition and identification of known barriers can help in increasing uptake. One of the recognised barriers to screening is lack of understanding about the smear test.

3.3.2. Promoting uptake and participation by women

The success of CervicalCheck depends on the uptake and ongoing participation of women in the target population. The potential percentage reduction in cumulative incidence of cervical cancer can only be achieved if a high proportion of the target population (over 80%) attend for cervical screening.

Standard 3-1

New women screened

A proportion of the women screened should be eligible women who have not been previously screened.	Achievable: 10% in a 12 month period. Min: 5%: in a 12 month period.

Note 1: Smeartakers should have an awareness of uptake of cervical screening in their practice.

Note 2: Where there is a recognised lack of uptake, specific measures shall be put in place to encourage women to attend for cervical screening.

Note 3: At all times, smeartakers should be aware that any woman has the right to decline to participate in the CervicalCheck programme.

Standard 3-2

Screening of the eligible population

Women screened should be eligible for programme screening as defined by the CervicalCheck Eligibility Framework.	Min: 100%

Note: Smeartakers should ensure that women who are not patients at their practice are facilitated if they request a smear test.

Standard 3-3

Adherence to recommended screening intervals

Smear tests for previously screened women should not be carried out earlier than the recommended interval.	Achievable: 100% Min: > 95%

3.3.3 Promoting smeartaking skills

Standard 3-4

Qualifications and professional registration of smeartakers

All smeartakers must be registered with the Irish Medical Council or An Bord Altranais.

Min: 100%

Standard 3-5

Maintenance of registration

All smeartakers must maintain their professional registration for the period of time that they are registered with CervicalCheck.

Min: 100%

Quality requirement

Change of status

Smeartakers should advise the programme office of any change to their professional registration status. They should also advise the programme regarding any change of location, retirement or when ceasing to provide smeartaking services.

Quality requirement

Access and availability of learning and reference resources

Each practice and clinic should have current versions of relevant learning and reference resources available and accessible for all those engaged in cervical screening. Relevant learning and reference resources, at a minimum, include:

- Guidelines for quality assurance in cervical screening. Second edition
- CervicalCheck Guide for Smeartakers[1]
- CervicalCheck Eligibility Framework[2]
- CervicalCheck Cytology Terminology Table[3]
- Health professionals section of the CervicalCheck website (www.cervicalcheck.ie)
- Online CervicalCheck learning resources (health professional section of the CervicalCheck website).

Quality requirement

Appropriate training

All cervical smeartakers should be appropriately trained. It is the duty of the doctor with clinical responsibility to ensure that all smeartakers who take smear tests in their practice or clinic are appropriately trained and competent. This is a dynamic requirement as competence is not static. Smeartakers should endeavour to attend a CervicalCheck smeartaker training course during the first three to five years following start of contract.

Quality requirement

Clinical updates

Smeartakers should participate in a CervicalCheck clinical update at least once every three years. Clinical updates may be delivered through face-to-face meetings (national, regional, continuing medical education [CME] or CervicalCheck-led) or through online virtual learning facilities.

Quality requirement

Supervision of new smeartakers

New smeartakers starting out in practice should carry out smear tests according to a defined plan under the supervision of a clinically responsible doctor. A new smeartaker is one who is starting out in practice, not having completed a CervicalCheck-recognised smeartaker training programme. The doctor with clinical responsibility should agree a set number of smear tests to be performed by the new smeartaker under supervision.

Standard 3-6

Smeartaking performance – unsatisfactory/inadequate rate	
In any defined period of time, the proportion of the total number of smear tests by an individual smeartaker reported as unsatisfactory/inadequate should be within a defined proportion relative to the programme average rate in the period.	1.5 times of programme average rate for the period

Note 1: Information regarding smeartaking performance is available from CervicalCheck.

Note 2: Where the unsatisfactory/inadequate rate is greater than the target, the individual smeartaker concerned may need to undergo retraining.

3.3.4 Optimal environment for women within a structured practice setting

A suitable environment will help establish rapport, relax, and encourage women. Every effort should be made to ensure that the smeartaking environment contributes to the comfort of women. Smeartaking services should be provided in an environment that respects the privacy, dignity and autonomy of women.

Quality requirement

Confidentiality

Confidentiality in relation to each woman and her personal information must be maintained throughout the cervical screening process.

Quality requirement

Data protection

The storage, access and transfer of women's personal and health information must be compliant with the Data Protection Act 1988[4], Data Protection (Amendment) Act 2003[5] and any future revision or amendments of the Act as well as the EU Directive 95/46/EC - The Data Protection Directive[6].

Quality requirement

Practice records

Each practice or clinic should manage and maintain accurate records in a safe and secure environment.

Quality requirement

Privacy and security

Smear tests must be carried out in a private and secure setting with respect to the woman's needs.

Quality requirement

Room temperature

Smear tests must be provided in a comfortable environment where the room temperature is ambient.

Quality requirement

Chaperone

A chaperone should be facilitated if the woman requires one. The chaperone or support person may be a relative or friend.

Quality requirement

Women with special requirements

Smeartakers should aim to facilitate women with special requirements where possible, including those who have a physical or intellectual disability. Smeartakers should aim to facilitate women who have a physical or intellectual disability with adequate time and an environment that accommodates their requirements. Wheelchair accessibility should be provided where feasible. An Access Officer is available to respond to access queries.

3.3.5 Appropriate equipment and materials

A list of the necessary equipment is provided in the CervicalCheck 'Guide for Smeartakers'[1]. There should be advanced preparation of smeartaking equipment and consumables. This must include expiry date checks of vials and speculae.

Quality requirement

Examination couch

An examination couch should be available. Consideration should be given to the use of a height-adjustable couch in order to assist women with physical disabilities.

Standard 3-7

Consumables – smear test kits and speculae

Smeartaking consumables in use must be within expiry dates.	100%

Note: Smeartakers must ensure that the sample vials used do not expire before reaching the laboratory.

Quality requirement

Single-use disposable speculae

CervicalCheck recommends the use of single-use disposable speculae. Single-use disposable specula should be opened just prior to smeartaking. There should be a range of speculum sizes available for use at the practice.

Quality requirement

Reusable speculae

Reusable speculae must be decontaminated ensuring that EU Sterilisation Guidelines are followed[7].

Quality requirement

Infection control

The practice or clinic should have infection control procedures in place. Smeartaking activity must adhere to these infection control procedures. Regular monitoring and review of infection control procedures must be in place to ensure their effectiveness.

Quality requirement

Clinical waste

Single-use disposable speculae and cervix brushes shall be disposed of as clinical waste.

3.3.6. Pre-screening: Preparation for the smear test

Quality requirement

Communication with the woman

All aspects of the cervical screening process should be clearly explained to the woman. This includes providing each woman (both new and returning women) with a copy of the Information Sheet for Women accompanying the Cervical Cytology Form[8]. The Information Sheet for Women is available in several languages and in Braille to assist smeartakers in explaining the cervical screening process and consent to participate. Pictorial leaflets are available for situations where language or literacy is an issue. Aspects of the cervical screening process to be communicated include:

- The smear test
- The importance of regular screening
- The accuracy and limitations of tests
- When and how results will be received
- The likelihood and meaning of a normal result
- What it means if further tests are required
- If results are abnormal, the options available, including an assessment of the risks, limitations, side effects and benefits of each option.

Quality requirement

Choice of smeartaker

The smeartaker should ensure that the woman is aware of her entitlement to choose her smeartaker within the practice.

Quality requirement

Informed consent by the woman

The woman must give her informed consent to participate in CervicalCheck. A woman's consent or indication of previous consent, by signature or by witnessed mark on the Cervical Cytology Form[8], is required to participate. Obtaining informed consent from a woman is the responsibility of the smeartaker. Consent is a legal requirement which allows the information about the woman to be transferred between service providers in the cervical screening pathway and the National Cancer Registry Ireland.

Consent to participate can never be given by a third party. Women may withdraw consent to participate in the screening programme by writing to the programme.

Women may choose not to be part of the CervicalCheck screening programme. Women who do not wish to be part of CervicalCheck should be facilitated to opt-off the programme.

When a woman is unable to provide informed consent for whatever reason and the medical practitioner deems her not to require cervical screening, she can be made inactive on the Cervical Screening Register (CSR). The woman will receive no further communication from the programme. This requires that an Opt-off by Medical Practitioner form is completed (download from www.cervicalcheck.ie) signed by the medical practitioner and forwarded to CervicalCheck.

Quality requirement

Use of CervicalCheck Cervical Cytology Form

A CervicalCheck Cervical Cytology Form[8] must be completed at the time of taking a smear test in the presence of the woman, to ensure accuracy.

Quality requirement

Identification of the woman

The smeartaker is required to record and relay a woman's current demographic details at the time of the smear test completely, accurately and legibly. Unique identification of the woman starts with the inclusion of all relevant details on the Cervical Cytology Form[8].

Quality requirement

Minimum data requirements

The woman's forename, surname, address and date of birth, along with the woman's indication of consent and the identification of the clinically responsible doctor or clinic should be accurately recorded on the Cervical Cytology Form at the time of the smear test and in the presence of the woman.

Quality requirement

Requirements for unique matching of individual women

Smeartakers must make every effort to obtain and accurately record as many elements as possible of the following:

- Woman's personal public service (PPS) number
- Woman's cervical screening programme identification number (CSP ID)
- Surname at birth
- Mother's maiden name
- Middle name
- Telephone number.

The woman's PPS number and CSP ID are unique permanent identifiers. The woman's surname at birth and mother's maiden name, together with her date of birth are permanent identifiers. Permanent identifiers are identifiers that do not change during a woman's lifetime. They are therefore of particular importance in identifying a unique woman and in matching screening events to her record on the CSR.

Standard 3-8

Accurate matching of the woman

The Cervical Cytology Form should record sufficient, accurate details to enable accurate matching of the woman with her record on the CSR.	Achievable: 98% Min: 95%

Note: Letters of invitation (call, re-call) to women contain her PPS number and CSP ID. Information on the PPS number or CSP ID can be found in the Guide for Smeartakers[1].

Standard 3-9

Identification of the doctor

The clinically responsible doctor for each smear test should be completely and accurately identified on the Cervical Cytology Form.	Achievable: 100% Min: 98%

Standard 3-10

Identification of the smeartaker

The smeartaker for each smear test should be completely and accurately identified on the Cervical Cytology Form.	Achievable: 99% Min: 95%

Standard 3-11

Quality of data – completeness, accuracy and legibility

Submitted Cervical Cytology Forms should not be returned, rejected or queried by either the cytology laboratory or by the programme office due to completeness, accuracy or legibility deficiencies.	Achievable: < 1% Min: < 3%

Note 1: Computer generated forms should be checked for quality of data.

Note 2: A ballpoint pen should be used when completing the form by hand and block capitals should be used where requested on the form.

3.3.7 Screening: undertaking the smear test

Effective cytological sampling is an integral component of a quality screening programme.

Standard 3-12

Minimum repeat interval

There must be a minimum of 3 months between any 2 smear tests.	Achievable: 100% Min: 99%

Quality requirement

Visualisation of the cervix

The cervix, where present, must be visualised, assessed and effectively sampled. A smear test should not be taken if the cervix has not been visualised. No more than three efforts should be undertaken to visualise the cervix.

Quality requirement

Sampling and Transformation Zone (TZ)

The smeartaker should ensure that all of the TZ is sampled. TZ sampling should be evident in at least 80 per cent of women under the age of 50. It is the smeartaker's responsibility to sample the correct site. Smear tests with no evidence of TZ sampling are not reported as 'inadequate'. However, the overall percentage of the smear tests taken by an individual which contain no evidence of TZ sampling is a useful indicator of overall smear quality. The optimal time for a smear test is mid-menstrual cycle, between day seven and fifteen.

Quality requirement

Condition of sample

All samples should be in an optimal condition. Optimal condition of the sample means that there is adequate solution in the vial, that there is no contamination with other liquids and that the sealed vial is not broken, damaged or leaking.

Quality requirement

Relevant clinical details and findings

All relevant clinical details (e.g. last menstrual period [LMP]) should be recorded on the Cervical Cytology Form[8] as appropriate.

Quality requirement

Previous smear test history

Cervical Cytology Forms[8] must have previous smear test history completed where known, available and relevant. The programme will keep a record of the woman's CervicalCheck smear test history which is available to the cytology laboratory. Management recommendations from the cytology laboratory are based on all available previous results. Smeartakers must ensure that the smear test result history is complete where appropriate e.g. three ASCUS results in 10 years.

Quality requirement

Previous treatment history

Previous treatment history of the cervix, where relevant (and date of treatment), must be recorded on every Cervical Cytology Form where known and available. The programme will keep the woman's CervicalCheck treatment history which is available to the cytology laboratory. Post-colposcopy recommendations for follow-up smear tests should be recorded.

3.3.8 Post-screening: after the smear test

Quality requirement

Woman's medical record

The smeartaker should ensure that smear tests taken are recorded in the correct woman's medical record. A new medical record should be established if one does not already exist. The medical record should record the date of the smear test and the smear test result. Computerised patient record-keeping is strongly encouraged as records are easily stored, readily available and retrievable for future use. Written or verbal communications in relation to the smear test result must be kept in the woman's record.

Quality requirement

Advising the woman of the results process

The woman should be informed of how and when the result of her smear test will be available. The result of the smear test is sent to the smeartaker and CervicalCheck. CervicalCheck will send a letter about her result to the woman.

Quality requirement

Sample identification

Sample vial labels must include the woman's forename, surname and date of birth as identifiers.

Quality requirement

Matching vial to form

The sample vial must be accurately matched with the associated Cervical Cytology Form. The detachable bar code label on the vial must be placed on the Cervical Cytology Form in addition to recording the surname, forename and date of birth on the vial.

Standard 3-13

Dispatch of samples

Vials and their associated forms must be dispatched to the cytology laboratory promptly after the test is taken.	Achievable: 95% within 5 working days. Min: 90%

Note 1: To facilitate the delivery of a result to the woman within four weeks, it is important to dispatch the sample promptly.

Note 2: It is the responsibility of the smeartaker to dispatch or post samples – women should never be requested to post their samples.

Quality requirement

Packaging of samples

All vials and forms must be packaged in the transport boxes appropriate for secure transport to the cytology laboratory. CervicalCheck recommends that the vials and forms should be packed for transportation in the boxes provided by the programme. Universal precautions should be employed for handling and packaging of all samples.

3.3.9 Management of smear test results

The practice or clinic protocol should include clear directions on roles and responsibilities for obtaining results of smear tests and providing women with their results. All staff, including reception staff, should be aware and informed of this protocol.

Quality requirement

Results management

Practices and clinics should have in place a consistent system regarding the management of smear test results. Women should be made aware of this process.

Quality requirement

Receipt and checking of cytology results

Outstanding results must be identified if they have not been received by the smeartaker within 28 working days from the smear test date and followed-up as appropriate.

A smear test result must be received by the smeartaker for each sample sent to the cytology laboratory. Results received from the cytology laboratory should be cross-checked with smear tests taken.

Quality requirement

Matching cytology results

Smear test results should be recorded in the correct woman's medical record. The woman's medical record must be updated with the smear test result and management recommendation.

Quality requirement

Checking management recommendations

Management recommendations accompanying cytology results should be checked in relation to the woman's screening history.

Smeartakers must access the most current information and documentation in relation to cytology results and management recommendations. Smeartakers need to check that the management recommendation associated with the cytology result is correct with regard to the woman's screening history. Smeartakers must contact the cytology laboratory if they have queries in relation to results or management recommendations.

Quality requirement

Communicating results and outcomes to women

Practices and clinics should have an appropriate system to communicate every smear test result or outcome to the woman concerned. A smeartaker is responsible for providing women with their result. All staff, including reception staff, should be aware and informed of the protocol for communicating results to women.

When the cytology result is abnormal, the woman should be given full details of the result and advised of the next step in the process of their management. Explanations should be clear and appropriate to the level of understanding of each woman.

3.3.10 Referral and follow-up of women

Quality requirement

Follow-up of women

Smeartakers should ensure that reasonable effort is made to follow-up smear test management recommendations ensuring that the appropriate action is taken.

Quality requirement

CervicalCheck Colposcopy Referral Form

The CervicalCheck Colposcopy Referral Form[9] should be used when referring a woman to colposcopy services.

A copy of the relevant cytology result report should accompany the Colposcopy Referral Form which should be sent to the colposcopy service directly.

Standard 3-14

Referral to colposcopy

Women whose cytology result carries a referral to colposcopy recommendation must be referred directly by the doctor with clinical responsibility to a colposcopy service promptly upon receipt of the cytology result.	≥ 90% within 10 working days.

Note 1: All referral information about the woman, her smear test and relevant history must be forwarded directly to the colposcopy service.

Note 2: Further communication with the colposcopy service regarding the referral should be facilitated when necessary.

Standard 3-15

Follow-up of abnormal results (information requests)

Doctors should complete, sign and return follow-up information requests to CervicalCheck (online or by post) promptly upon receipt of the request (by letter).	≥ 90% within 10 working days.

Note 1: CervicalCheck will send an abnormal follow-up (failsafe) information request to the clinically responsible doctor.

Note 2: Failsafe follow-up of abnormal results refers to the CervicalCheck procedure that is triggered when a recommended action for a woman following an abnormal smear test result has not occurred (or if the programme has not been informed).

Note 3: Smeartakers must contact the woman, when required, to obtain the necessary information for completion of the information request. Every reasonable effort (at least two recorded efforts) should be made to contact the woman.

Quality requirement

Continuity of care of a woman

During and following her cervical screening pathway in primary care, a woman should have a doctor with clinical responsibility assigned to her care. If the doctor with clinical responsibility in the primary care setting leaves the practice or clinic for whatever reason, he or she remains clinically responsible for women who have had smear tests at his or her former practice or clinic until alternative arrangements are made.

3.3.11 Quality assurance monitoring

Quality requirement

Periodic review

The practice or clinic should conduct a periodic review of its cervical screening activity and a review of compliance to CervicalCheck 'Guidelines for Quality Assurance in Cervical Screening'.

Clinically responsible doctors should review their cervical screening activity and their practice or clinic's compliance to the 'Guidelines for Quality Assurance in Cervical Screening' at periodic intervals (suggested once every 3-5 years). The audit scope and outcomes should be recorded and planned actions should be documented and implemented.

3.4 References

1. National Cancer Screening Service: CervicalCheck. 2011. Guide for Smeartakers, 2nd Edition.
2. CervicalCheck Eligibility for Cervical Screening Framework (CS/SPP/PM-9).
3. CervicalCheck Cytology Terminology Table (CS/PUB/LAB-2).
4. Data Protection Act 1988. Number 25 of 1988.
5. Data Protection (Amendment) Act 2003. Number 6 of 2003.
6. EU Directive 95/46/EC - The Data Protection Directive. Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.
7. HSE Standards and Recommended Practices for Decontamination of Reusable Invasive Medical Devices (RIMD), Version 2.1; 2011.
8. CervicalCheck Cervical Cytology Form (CS/F/LAB-2).
9. CervicalCheck Colposcopy Referral Form (CS/F/CLP-6 Rev 9).

Chapter 4

Quality assurance in cytopathology

4.1 Introduction

The quality of results issued by a cervical cytology laboratory depends on adequate sampling, handling, and staining of cytology samples, screening and interpretation of cytology slides and reporting of results. The objective of a quality assured laboratory service is to accurately identify those cervical cancer precursors likely to progress to invasive cancers (maximising the benefits of screening) and avoid the detection and unnecessary treatment of benign lesions that are not destined to become cancerous (minimising the potential harms associated with screening).

The cervical screening pathway involves three key stages:

- Smeartaking, sample transport and receipt of sample in the laboratory (pre-analytical)
- Sample processing, screening and interpretation (analytical)
- Report generation, call, re-call protocols and patient management (post-analytical)

The quality requirements and standards for cytopathology laboratories providing services to CervicalCheck are set with regard to:

- The first edition of 'Guidelines for Quality Assurance in Cervical Screening'
- European guidelines for quality assurance in cervical cancer screening[1].
- The evolution of standards and guidelines in response to technological developments and research outcomes in other cervical screening programmes. Particular reference is given to revisions in the NHS CSP Publication No. 1 (revised 2012)[2] and the BSCC 'Code of Practice for Laboratories Participating in the UK Cervical Screening Programmes' (2010)[3]
- The activity and performance metrics for cytopathology collated since the commencement of CervicalCheck.

Compliance with the requirements and standards is measured and monitored by:

- Quality metrics reports by cytopathology laboratories.
- Analysis of data provided to the Cervical Screening Register (CSR) by cytopathology, colposcopy and histopathology services providers.
- Quality assurance site visits to laboratory providers.
- Monitoring and review of operational activity and performance data.

4.2 Quality requirements and standards in cytopathology

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

4.2.1 Organisational requirements

Standard 4-1

Accreditation

The laboratory will have and maintain accreditation to ISO15189 standard[4] or equivalent, certified and documented by an approved accreditation body. The scope of the laboratory accreditation must include cytopathology.	External accreditation at least once every 2 years.

Note : Laboratory accreditation covers facilities, staff qualifications, training and competencies, equipment, laboratory information systems and quality management systems.

Standard 4-2

Capacity

Individual cytopathology laboratory facilities will have the capacity to process a minimum cytology screening throughput.	Min: 25,000 samples per annum. Achievable: 35,000 samples per annum.

Quality requirement

Data protection

In relation to the provision of services to the National Cancer Screening Service (NCSS), all data protection requirements (storage, access, security, confidentiality and data transfer) should be compliant with the Data Protection Act 1988[5], the Data Protection (Amendment) Act 2003[6] and any future revisions or amendments of the Act as well as the EU Directive 95/46/EC - The Data Protection Directive[7].

A Virtual Private Network (VPN) should be installed between the laboratory and the programme operations office for the secure exchange of electronic data.

Quality requirement

Health and safety compliance

The laboratory should be compliant with all national legal and statutory health & safety requirements.

Quality requirement

Quality management system

The laboratory should have a quality management system (QMS) in place as required by their accreditation standard.

The laboratory should have a designated person responsible for quality management who will liaise with the NCSS to resolve any quality issues that may arise.

Any complaints in relation to the provision of the cytology services on behalf of NCSS will be notified to the NCSS.

Quality requirement

Laboratory information management system (LIMS)

A computerised laboratory information management system (LIMS) should be installed and be in operation in the laboratory. The LIMS should be in a secure facility with adequate back-up arrangements, on- and off-site. Access to the LIMS should be by privilege-level access control. The LIMS should be capable of generating periodic quality metrics and audit returns to the NCSS.

In addition the LIMS should:

- Link multiple test results for the same patient
- Provide easy access to details about previous cervical cytology and histology of the patient
- Provide a mechanism for ascertaining and recording clinical outcome after cytology tests, including colposcopy findings, treatments, biopsies and reasons for biopsies not being taken
- Provide the data necessary for evaluation of the CervicalCheck programme.

Quality requirement

Data capture

The LIMS should be capable of recording the data required by the NCSS (Cervical Screening Register (CSR) information system data entry standards demographic details[8]) from the CervicalCheck Cervical Cytology Form[9].

Quality requirement

Reporting

The LIMS should be capable of recording screening results including management recommendations. The LIMS should be capable of recording the identity of the reporting screeners and pathologists.

Quality requirement

Format and timing of electronic data exchange with programme

The LIMS should be capable of extracting and transferring required data to the programme in the required format as per NCSS specifications (notification and result files). The laboratory should also receive information from the programme in specified formats and transfer it to its information systems (error and history/ eligibility files).

The laboratory should have in place the capability to exchange electronic communications between staff members and programme staff through secure protocols (e.g. secure email).

Quality requirement

Capability and format for electronic orders and results

It is desirable that laboratories should be capable of receiving orders electronically and issuing results electronically to and from ordering doctors or clinics, according to a specified messaging standard. Electronic laboratory order format is HL-7 based and conforms to the laboratory order message specifications of the Health Information and Quality Authority's (HIQA) current GP Messaging Standard[10]. HL-7 based orders and results use the Healthlink Message Broker System. The physical form for electronic orders includes a barcode, which laboratories should be able to scan and extract the included details for automatic import into their data entry system.

Quality requirement

Segregation, identification and traceability of programme samples

All work carried out in relation to the provision of laboratory services to the NCSS should be clearly distinguishable from the work carried out for other clients of the laboratory, beginning with receipt of samples, throughout the screening and resulting processes, to reporting, later investigations and reviews, as well as storage and archiving.

Quality requirement

Telephone support

Laboratories should provide Freephone telephone access (for calls made from Ireland) to laboratory staff during normal business hours (09.00-17.30 GMT each working day) for registered smeartakers and NCSS staff, for queries and follow-up.

Quality requirement

Changes to service capacity, capability or conformance to quality assurance (QA) standards

Any changes that have or could have an impact on any aspect of the laboratory services, including laboratory accreditation status, processes, system procedures, analysis, and reporting should be agreed with the NCSS. Any changes must be advised in advance, in writing, to the NCSS.

Quality requirement

Other laboratories

Laboratories should make relevant clinical information and follow-up data available to other laboratories providing services to CervicalCheck.

Quality requirement

Health agencies and authorities

Laboratories engaged by CervicalCheck should comply with all requests for data or reports by Irish health agencies and authorities, including the Department of Health and the National Cancer Registry Ireland (NCRI).

4.2.2 Laboratory facilities

Cytopathology services should be provided in a dedicated laboratory area/facility. All areas should be well lit, well ventilated, quiet and spacious. Samples receipt, discrepancy handling, and data entry areas should be readily identifiable. The screening room, the sample preparation room and the secretarial room should be separate rooms. The specimen preparation area should be equipped with effective exhaust systems and approved biological safety cabinets where required.

There should be appropriate storage facilities for flammable and toxic chemicals as required by national and regional legal and statutory health and safety requirements. Chairs, desks and microscopes should be ergonomically designed.

High-quality binocular microscopes should be available for all screening staff. Microscopes should include 4x 10x 20x and 40x objectives and be capable of marking slides. A multi-headed microscope should be available for training purposes or discussion of difficult cases.

4.2.3 Staff qualifications

Scientific, medical and non-medical staff should be qualified for the positions they hold according to national requirements to practice.

The cytopathology laboratory should be led by a medically qualified consultant who works in that discipline on a regular basis. All cervical cytology samples that have been identified as abnormal or possibly abnormal should be examined and reported by a medically qualified consultant.

There should be a lead medical scientist or cytology manager who is responsible for the day-to-day management of the department with responsibility for supervision of non-medical staff. Roles and responsibilities should be defined and should be incorporated into the laboratory quality manual.

4.2.4 Specimen reception

Standard operating procedures should be in place for handling CervicalCheck samples.

Quality requirement

Acceptance of samples

Laboratories should accept orders via postal delivery and electronic laboratory orders where applicable (followed by the receipt of the physical sample and form). For electronic orders the laboratory should be capable of extracting bar-coded information.

The laboratory should only accept programme samples from practices and clinics that are notified to the laboratory by CervicalCheck.

Only those samples accompanied by a CervicalCheck Cervical Cytology Form[9] or Cervical Cytology and HPV Form[11] should be accepted.

Quality requirement

Indication of consent

Only those samples indicating either signed consent or prior consent by the woman should be accepted. All forms should be date-stamped upon receipt.

Quality requirement

Matching of vials and forms

Sample vials should be matched to associated form prior to labelling. To ensure a robust 'chain of custody' cross-checking of a minimum of three and preferably four patient identifiers should be performed.

Quality requirement

Discrepancy handling and resolution

A discrepancy handling and resolution process should be in place to manage all discrepancies with received CervicalCheck samples. A CervicalCheck guidance document is available[12].

Discrepancies with received samples should be recorded and the log should be made available to CervicalCheck. The format of the log must be approved by CervicalCheck. All supporting documentation and actions taken in discrepancy resolution should be recorded and traceable.

Quality requirement

Vial and form tracking

After second person verification of correct correlation of the sample vial with the corresponding form, and acceptance of the sample and form for processing, both should be labelled with a laboratory-generated unique identification number.

4.2.5 Data entry and notification to CervicalCheck

Quality requirement

Data capture

Data entry of the details recorded on CervicalCheck forms accompanying submitted sample vials should conform to CervicalCheck data capture requirements[8].

All relevant data recorded on the Cervical Cytology Form by the smeartaker should be entered onto the LIMS (Cervical Cytology/Cervical Cytology+ HPV/Cervical HPV Requests and Results[13]).

A second-person verification of all relevant data entered from the form on to the computer system should be carried out and deemed to be correct before the sample is authorised for further processing.

Quality requirement

Laboratory accession number

A unique permanent accession number must be assigned to each sample.

Note : The unique laboratory accession number for the sample must remain constant whether the sample is for cytology screening only, HPV testing only, or both cytology screening and HPV testing.

Quality requirement

Assignment to ordering doctor or clinic

Samples should be assigned to the correct clinically responsible doctor or clinic (CervicalCheck Registered Smeartakers Types and Identification[14]) as per the received form.

Standard 4-3

Access to received Cervical Cytology Forms	
Copies of all submitted Cervical Cytology Forms, in electronic format and indexed by the laboratory accession number, will be made available promptly to CervicalCheck.	100% within 7 working days of acceptance.

Standard 4-4

Notification of sample receipt to programme	
Samples, once received, will be notified promptly by electronic means to CervicalCheck.	95% within 48 hours of receipt of sample. Min: 80% by 17:00 GMT next working day.

Note 1: A tracking system or log should be in place to verify that the number of electronic notifications sent to CervicalCheck on any given day equals the number of samples entered onto the LIMS that day.

Note 2: A weekly reconciliation of files sent or received should be in place between CervicalCheck and the cytology laboratory.

Quality requirement

Programme ineligible samples

Samples identified by CervicalCheck as ineligible for the screening programme should not be processed. Certain samples that are not to be processed may have to be reported. These include expired vials and samples that are not processed but a report is sent to both CervicalCheck and the requesting doctor. Ineligible samples may be required to be returned to the doctor or clinic.

4.2.6 Sample processing

Quality requirement

Cytology technology

Liquid-based cytology (LBC) is mandatory. Liquid-based specimens must be processed according to the manufacturer's instructions. Processors used to prepare slides must be maintained only by laboratory staff who have been trained by the manufacturers or individuals designated by the company.

Quality requirement

Staining

Slides should be stained using the Papanicolau stain (original or modified). The samples should have a cover slip that covers all the cellular material. Internal technical quality assurance checks should be carried out routinely including quality of staining and quality of preparation. The results of these checks should be available for review and should specify individual machines if multiple machines are used. All laboratories should participate in a recognised technical external quality assurance (EQA) scheme.

Quality requirement

Identification of case/slide

Standard operating procedures (SOPs) for handling samples should ensure a robust 'chain of custody' across the specimen pathway. These involve the cross-checking of a minimum of three and preferably four patient identifiers at each stage. Mandatory identifiers include surname and first initial of forename. Other identifiers include full forename, date of birth and cervical screening programme identification (CSP ID) number. Slide labels should include patient surname and forename or first initial of forename in addition to the barcode and accession number. Where the laboratory uses automated processors which read and transfer the unique laboratory accession number (barcode) onto the slide, it may not be necessary to include all three identifiers on the sample slide.

4.2.7 Proficiency and competency of staff

Quality requirement

Pathologists

All pathologists should participate in continuing professional development (CPD) relevant to their clinical practice. All consultant pathologists participating in CervicalCheck should participate in a recognised cervical cytopathology EQA scheme.

If there is an absence from work for a period exceeding six months then the individual should undertake a short period of retraining consisting of double screening a minimum of 150 cases with 95 per cent sensitivity for HSIL and have successfully participated in the most recent round of EQA slides/proficiency testing.

Standard 4-5

Pathologist - proficiency	
To maintain a medical consultant's diagnostic skill in cervical cytopathology, a minimum number of cases will be reviewed.	Min: 750 cases per annum.

Standard 4-6

CPC/MDT meetings	
Pathologists reporting Irish workload will participate in regular CPC/ MDT meetings.	Min: 50% of meetings. Achievable: 90% of meetings.

Quality requirement

Lead medical scientist, cytology manager and supervisory scientific staff

The lead medical scientist or cytology manager should be responsible for maintaining a high quality service.

Sufficient supervisory scientific staff should be available to provide satisfactory supervision for checking cervical samples, training, service development and quality control. Competence for the role should be ascertained before solo checking of cervical samples.

Standard 4-7

Lead medical scientist, cytology manager, supervisory scientific staff	
If the role involves cervical screening then a minimum number of cases will be reviewed.	750-3,000 cases per annum depending on role.

Quality requirement

Cytology screening staff

Cytology screening staff can participate in the primary, double and rapid screening of cervical samples. They should only sign out cases which they deem to be negative or inadequate.

All screeners (including supervisory screening staff) should maintain their competence through participation in proficiency testing schemes, recognised cervical cytopathology EQA schemes and in-house training, as appropriate.

If there is an absence from work for a period exceeding three months then the individual should undertake a formal period of retraining. If absent for more than six months, then, external training may be required.

Standard 4-8

Screener proficiency

In order to maintain proficiency, a minimum number of smear tests per year must be screened per screener.	Min: 3,000 cases per annum.

Standard 4-9

Primary screening

In order to maintain quality, accuracy and safety in the screening process, the maximum time spent on primary screening LBC smear test samples must not be exceeded.	Max: 5 hours per day.

Standard 4-10

All screening – maximum hours

Screening should be limited within a 24-hour period.	Max: 6 hours per day.

Note 1: The maximum screening hours includes both primary and rapid screening.

Note 2: Regular breaks will be provided to prevent screener fatigue.

Standard 4-11

All screening – maximum numbers per annum

Maximum primary screening numbers per screener per annum must not be exceeded.	Max: 12,000 per annum.

Quality requirement

Continuing education

There should be protocols and practices in operation to demonstrate a system of both internal and external continuing education for scientific and medical staff reporting CervicalCheck cases. Internal continuing education may comprise some or all of the following:

- Discussion of difficult/review cases between cytotechnologists, medical scientists and/or cytopathologists. Laboratories should have a multi-headed microscope for this purpose
- Provision of up-to-date cytology textbooks and/or electronic material for consultation in the cytopathology laboratory
- Access to one or more of the cytology journals.

External continuing education may comprise some or all of the following:

- Attending workshops and symposia
- Attendance at regular update courses
- Regional inter-laboratory slide review sessions
- Participation in proficiency testing
- Teaching cytotechnology students, pathology residents and fellows
- Independent study contributions to laboratory handbooks or work in committees of the relevant medical societies.

4.2.8 Microscopy

Quality requirement

Access to a woman's previous screening history

Prior to the assessment of the sample, the patient's screening history will be retrieved from the local laboratory files and/or the CervicalCheck screening database and be made available to the scientific staff screening the sample. Within 48 hours of receipt of sample notification, CervicalCheck will transmit an electronic file or record containing all previous screening history for the woman known to the programme for samples that are to be processed by the laboratory.

Quality requirement

Primary screen

All samples to be processed should receive a full manual primary screen, unless the cytology laboratory is notified by CervicalCheck that primary screening may utilise automated-assisted screening.

All the material on the slide must be examined. Screeners should overlap fields by at least 30 per cent. Screening should be carried out using a x10 objective, but in particularly crowded or difficult samples, it may be safer to slow down considerably or screen using a x20 objective.

Screeners should record their results independently on the LIMS.

Quality requirement

Rapid review/re-screen

All samples other than those requiring reassessment should receive a manual rapid re-screen, or automated assisted re screen as notified by the NCSS.

Manual rapid re-screen should take approximately 60-90 seconds and aims to cover a representative area of the cellular material.

Individuals should undergo basic training in the different skills and techniques involved in manual rapid screening and automated screening before they are permitted to carry it out.

Screening performance will be monitored.

Quality requirement

Internal quality control

Accuracy of screening must be monitored and managed with approved protocols and procedures for defining and dealing with poor performance.

Internal quality control of cytology screening must be monitored by:

- Re-screening of slides initially judged during primary screening as negative or inadequate to detect false positives/negatives and to determine sensitivity and specificity rates
- Monitoring screening detection and reporting rates by measuring the percentages of the main types of cytological findings (high grade, low grade, inadequate, undetermined, negative) detected by individual screeners and cytopathologists, and in comparison with the laboratory as a whole, the programme and national standards
- Performance evaluations to identify those with deficiencies in knowledge and skills who would benefit from a more directed educational programme
- Correlation of cytology with clinical/histological outcomes
- Re-screening of samples from women with negative or low grade test results less than 3 or 5 years before diagnosis of invasive cancer
- Correlation of cytology with HPV testing for smear tests reported as ASCUS
- Monitoring and analysis of quality metrics as requested by CervicalCheck.

4.2.9 Results management

Quality requirement

Cytology screening results – reporting

Cytology patterns must be reported with the detail and the format specified by CervicalCheck.

Quality requirement

Cytology terminology and assignment of management recommendations

All cytology results must have a management recommendation accompanying the cytology pattern as a P and R code combination (Cervical Cytology Management Recommendations Explanatory Guide[15] and Cytology Terminology Table[16]).

Note : Where a combined cytology screen and HPV test is carried out, the management recommendation will be assigned using the appropriate cytology and HPV management recommendations table for follow-up of women post-treatment, or similar NCSS publication for other HPV test scenarios.

Quality requirement

Management recommendations with respect to screening history

The management recommendation should be correct for each cytology result with respect to the screening history of the woman.

The screening history of the woman provided by the smeartaker via the Cervical Cytology Form[9] and by CervicalCheck from the CSR (where such history is available) must be referred to and taken into account during the results process, in order to assign the correct management recommendation.

CervicalCheck uses the management recommendation accompanying results to issue appropriate correspondence where appropriate to a woman advising her of her next recommended step in the screening programme.

Quality requirement

Check of result and recommendation

An independent check of the case result and management recommendation should be in place, prior to report authorisation, to minimise the risk of error.

Quality requirement

Authorisation of results

Every result must be appropriately authorised before release. Every report should be checked for inconsistencies before authorisation.

Depending on the national legal requirements under which the laboratory operates, the cytological reports may be signed (electronically or manually) either by cytotechnicians or the cytopathologist or medical scientist in charge.

Abnormal cytology results will only be reported by a pathologist.

Reports should identify the cytotechnologist or medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

Quality requirement

Result codes notification to programme

Results, once authorised and released, will be issued in summary format (P & R codes as soon as possible by electronic means to CervicalCheck).

Standard 4-12

Laboratory response time (turnaround time [TAT])

Cytology results must be authorised, released and transmitted to CervicalCheck within the target TAT from sample validation by the NCSS.	95% within 10 working days.

Note 1: If the target for turnaround (TAT) time cannot be achieved for any period exceeding three working days, CervicalCheck must be immediately informed. A plan to remove the delay must be provided within one week.

Note 2: No category of urgent smear test exists within the screening programme.

Quality requirement

Adequacy of results reports

The contents of the results report to doctors and clinics must be in accordance with Cervical Cytology/Cervical Cytology+ HPV/Cervical HPV Requests and Results[13].

Standard 4-13

Results reports to ordering doctors and clinics

Results, once authorised and released, must be issued promptly to the ordering doctor or clinics.	99% to be received within 5 working days.

Note: The issuing of results should take account of the time taken for delivery of printed paper results (post or courier) to meet the target for receipt by the ordering doctor or clinic.

Quality requirement

Delivery of results reports to ordering doctors or clinics

Results reports will be issued to the correct ordering doctor or clinic.

Documented processes are required to:

- Ensure that results are sent to the correct doctor
- Handle discrepancies between the number of samples/notifications received, the number of reports transmitted and the number of reports printed.

Quality requirement

Results reports by electronic means

It is desirable that all results reports in addition to paper format be issued to ordering doctors/clinics and CervicalCheck in full electronic format via a nominated telecommunications pathway. The electronic format for results is HL-7 based and conforms to the laboratory result message specifications of HIQA's GP Messaging Standard[10].

Quality requirement

Re-screening requests and amended reports

Laboratories will have procedures in place to manage and respond to requests for re-screening and amended management recommendations, and provide replacement reports to doctors/clinics where necessary. Amended results, once authorised and released, must adhere to the same standards and targets.

4.2.10 Storage and archiving

The laboratory must ensure adequate administration and secure archiving and disposal of Cervical Cytology Forms, samples, slides and written and/or computerised reports.

Administration, archiving and disposal procedures must comply with accreditation standards and national legislation, including that relating to confidentiality and data security of personal health information.

Standard 4-14

Storage and archiving

Secure archiving of Cervical Cytology Forms, samples, slides and written and/or computerised reports is required for specific retention periods.	99% to be received within 5 working days.
Cervical Cytology Forms	30 years
Slides	Min 10 years
Sample vials	6 weeks
Reports	30 years

Note 1: Cervical Cytology Forms may be in paper format or in their electronic equivalent.

Note 2: All slides must be stored in conditions adequate for preservation.

Note 3: Records will be stored to allow prompt retrieval if required.

Quality requirement

Access to materials

Laboratories are required to provide access to CervicalCheck to materials including slides and records on request.

4.2.11 Clinico-pathological conferences (CPC)/multi-disciplinary team (MDT) meetings

Quality requirement

Support for CPC/MDT meetings

Cytology laboratories will provide facilities, participation and support for CPC/MDT meetings held in programme colposcopy services[17].

Such support will include the following:

- Real-time correlation between histopathologist and cytopathologist with the provision of the original glass slides, if requested.
- The provision of a web-based digital slide viewing system for all CPC/MDT meetings, as required.

Cases discussed at CPC/MDT will include discrepancies between two or more of the diagnostic results (cytology/colposcopy impression/histology), glandular abnormalities and cancers. Discrepancies are defined as a difference of two or more grades of abnormality.

Quality requirement

Participation in CPC/MDT meetings

The cytopathologist(s) (with or without other scientific staff members) will participate in CPC/MDT meetings.

CPC/MDT meetings are convened by CervicalCheck colposcopy services. The locations, timing and frequency of CPC/MDT meetings may vary from time to time but reasonable notice should be provided by colposcopy services to the cytology laboratory. Cytology laboratories are encouraged to submit cases for discussion where of benefit.

Quality requirement

Protocol for CPC/MDT meetings

Participation, including a signed record of personnel attending and operational decisions, must be recorded[17]. Participants must be subject to national legislation relating to confidentiality and data security of personal health information[5,6].

Cytology laboratories are encouraged to incorporate CPC/MDT meetings into the internal continuing education of scientific staff.

Quality requirement

Provision of slides

Cytology laboratories will retrieve and provide slides or digital images for cases notified for review at CPC/MDT meetings on request, within 10 working days.

4.2.12 Cancer review process

The CervicalCheck Cancer Review Process reviews notified cases of invasive cervical cancers. It operates as a feedback and learning process within quality assurance, contributing to potential continuous improvement measures.

Quality requirement

Re-screening of smear tests

The cytology laboratory must review slides for women with a diagnosis of invasive cancer, as requested by the programme, and provide the results of these reviews to CervicalCheck.

Quality requirement

Independent third-party review

Cytology laboratories will provide all case material as requested by CervicalCheck for cases identified as warranting independent third-party review by the CervicalCheck Cancer Review Process.

4.2.13 Quality assurance and continuous improvement

Quality requirement

External quality assurance (EQA)

Laboratories will participate and show adequate performance in accredited (EQA) schemes for cytology screening and for technical quality.

Standard 4-15

Quality metrics

A complete and accurate report containing prescribed quality metrics will be provided at regular intervals to CervicalCheck.	Complete data at least quarterly, to be received by CervicalCheck within one month of quarter-end.

The quality metrics collected during internal quality control procedures are used for monitoring, assessment, reporting, review and feedback purposes.

The quality metrics required are detailed in the current version of the CervicalCheck Cyto1[18]. The metrics should be readily available from the laboratories internal quality control processes. They include metrics for both the laboratory and for individual screeners and cytopathologists.

Quality requirement

Identification of individuals

The identifier assigned to each individual screener and cytopathologist will be the same for different metrics of the report and over successive reporting periods.

Quality requirement

CervicalCheck workload

Laboratories will have the ability to separate CervicalCheck workload from other workloads for statistical and monitoring purposes.

Quality requirement

Quality metrics improvement

Laboratories will undertake appropriate and timely measures to address performance issues that impact upon quality metrics and cause values outside of laboratory, national and/or international norms.

Individual screeners whose percentile rates are outside national percentile ranges may be required to cease working on CervicalCheck specimens until evidence exists that their reporting profiles are within acceptable parameters. Evidence of retraining may be sought by CervicalCheck.

Quality requirement

Quality assurance visits

Cytology laboratories will accommodate on-site visits by NCSS-designated personnel for quality monitoring, audit and assurance purposes, providing access to personnel, resources, processes, documentation and results.

4.3 References

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14. CervicalCheck registered smeartakers types and identification (CS/PUB/A-15).
15. CervicalCheck Cervical Cytology Management Recommendations Explanatory Guide (CS/PUB/LAB-1).
16. CervicalCheck cytology terminology table (CS/PUB/LAB-2).
17. CervicalCheck Guidance for CPC/MDT meetings for colposcopy services - planning successful collaboration for web-based interactive meetings between colposcopy, histopathology and cytology (CS/PUB/CLP-2).
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Chapter 5

Quality assurance in HPV testing

5.1 Introduction

The role of persisting high risk human papilloma virus (HR-HPV) infection among women with cervical intraepithelial neoplasia (CIN) and cervical cancer is now clearly established.

HPV testing post colposcopy treatment was introduced into the cervical screening programme in 2012.

The reported negative predictive value of HR-HPV testing for CIN is over 99 per cent, therefore women who are negative for HR-HPV post-treatment are at very low risk of residual disease and may be discharged to routine re-call. By employing HPV testing post colposcopy treatment, approximately 80 per cent of treated women avoid having to undergo annual smear tests. HPV testing may be employed in other scenarios in due course. These include ASCUS triage which will allow women who receive a cytology result of ASCUS but are HPV negative and therefore at low risk to be returned to routine re-call. Those who are ASCUS on cytology and HPV positive can be followed-up at colposcopy services as appropriate. HPV testing may also be employed for the management of difficult cases in colposcopy.

HPV testing for CervicalCheck is carried out on the residual fluid remaining in the Thinprep® vial post-processing for cytology screening. As both tests are carried out on the same sample, the programme requires the cytology laboratory to inform it when a HPV test has been ordered or authorised. The same laboratory accession number is required for a combined cytology and HPV sample. For this reason, many of the requirements below are also outlined in Chapter 4.

HPV testing may be carried out in the cytology laboratory, a microbiological lab or a dedicated molecular testing laboratory. Regardless of the location of the testing environment, there are a number of quality requirements and standards that must be in place to ensure accurate and reliable results. The requirements are essential elements in the organisation, management and interface of a laboratory operating within a cervical screening programme. The standards are the metrics for specific elements of the performance of a laboratory. The statement of each standard is accompanied by both an achievable and a minimum target.

The quality requirements and standards for laboratories providing HPV testing services to CervicalCheck are set with regard to the evolution of standards and guidelines in response to technological developments and research outcomes in other cervical screening programmes, with particular reference to revisions in the NHS 'CSP Publication No. 1' (revised 2012)[1] and the NHS 'HPV Triage and Test of Cure: Implementation Guidance'[2] document.

Compliance with the requirements and standards is measured and monitored by:

- Quality metrics reports by laboratories
- Analysis of data provided to the Cervical Screening Register (CSR) by cytopathology, colposcopy and histology services providers
- Quality assurance site visits to laboratory providers
- Monitoring and review of operational activity and performance.

5.2 Quality requirements and standards

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

Several of the quality requirements and standards set out below may be simultaneously fulfilled if HPV testing is carried out by a cytopathology laboratory providing services to the screening programme.

5.2.1 Organisational requirements

Standard 5-1

Accreditation

The laboratory will have and maintain accreditation to ISO15189 standard[3] or equivalent, certified and documented by an approved accreditation body. The scope of the laboratory accreditation must include HPV testing.	External accreditation at least once every 2 years.

Note: Laboratory accreditation covers facilities, staff qualifications, training and competencies, equipment, laboratory information systems, and quality management systems.

Quality requirement

Data protection

The storage, access and transfer of women's personal and health information shall be compliant with the Data Protection Act 1988[4] and the Data Protection (Amendment Act) 2003[5] and any future revisions or amendments of the Act as well as the EU Directive 95/46/EC - The Data Protection Directive[6].

Quality requirement

Health and safety compliance

The laboratory shall be compliant with all national legal and statutory health and safety requirements. The Clinical and Laboratory Standards Institute (CLSI) document 'MM3-A2-Molecular Diagnostics Methods for Infectious Diseases; Approved Guideline-Second Edition'[7] is the reference document recommended.

Quality requirement

Quality management system (QMS)

The laboratory shall have a quality management system (QMS) in place as required by their accreditation standard. The laboratory shall have a designated person responsible for quality management who will liaise with CervicalCheck to resolve any quality issues that may arise.

Any complaints in relation to the service shall be notified to the NCSS.

Quality requirement

Security of electronic data exchange with programme

A Virtual Private Network (VPN) shall be installed between the laboratory and the programme operations office for the secure exchange of electronic data.

Quality requirement

Laboratory information management system (LIMS)

A computerised laboratory information management system (LIMS) will be installed and be in operation in the laboratory.

The LIMS will be in a secure facility with adequate backup arrangements, on- and off-site. Access to the LIMS will be by privilege-level access control. The LIMS will be capable of generating periodic quality metrics and audit returns to CervicalCheck.

Quality requirement

Data capture

The LIMS will be capable of recording the data required by CervicalCheck (Cervical Screening Register information system data entry standards demographic details[8]) from the sample and Cervical Cytology Form[9] or Cervical Cytology and HPV Form[10].

Quality requirement

Format and timing of electronic data exchange with the programme

The LIMS will be capable of extracting and transferring required data to the programme in the required format as per CervicalCheck specifications (notification and result files). The laboratory will also receive information from the programme in specified formats and transfer it to its information systems (error and history/eligibility files).

The laboratory will have in place the capability to exchange electronic communications between staff members and programme staff through secure protocols (e.g. secure email).

Quality requirement

Reporting

The LIMS will be capable of recording test results including combined cytology and HPV management recommendations. The LIMS will be capable of recording the identity of the person authorising the HPV report.

Quality requirement

Capability and format for electronic orders and results

It is desirable that laboratories are capable of receiving orders electronically and issuing results electronically to and from ordering doctors or clinics, according to a specified messaging standard. Electronic laboratory order format is HL-7 based and conforms to the Laboratory order message specifications of the Health Information and Quality Authority (HIQA) current GP Messaging Standard[11]. HL-7 based orders and results use Healthlink's Message Broker System. The physical form for electronic orders includes a barcode, which laboratories shall be able to scan and extract the included details for automatic import into their data entry system.

In addition the laboratory information system (LIMS) should:

- Link multiple test results for the same patient
- Provide easy access to details of previous cervical cytology and histology of the patient
- Provide a mechanism for ascertaining and recording clinical outcome after cytology tests, including colposcopy findings, biopsies and reasons for biopsies not being taken
- Provide the data necessary for evaluation of the cervical screening programme.

Quality requirement

Changes to service capacity, capability or conformance to quality assurance standards

Any changes that impact on or could have an impact on any aspect of laboratory services, including laboratory accreditation status, processes, system procedures, analysis, and reporting will be agreed with CervicalCheck. Any changes will be advised in advance in writing to CervicalCheck.

Quality requirement

Other laboratories

Laboratory/ies will make relevant clinical information and follow-up data available to other laboratories providing services to CervicalCheck.

Quality requirement

Health agencies and authorities

Laboratories engaged by CervicalCheck will comply with all requests for data or reports by Irish health agencies and authorities, including the Department of Health and the National Cancer Registry Ireland (NCRI).

5.2.2 Laboratory facilities

HPV testing services will be provided in a dedicated laboratory area or facility. All areas will be clean, well lit and well ventilated. There will be appropriate storage facilities for flammable and toxic chemicals as required by national legal and statutory health and safety requirements.

5.2.3 Staff qualifications

Scientific, medical and non-medical staff will be qualified for the positions they hold according to national requirements to practice.

The laboratory carrying out HPV testing will be led by, or have access to a medically qualified consultant who works in that discipline on a regular basis. This is to facilitate high-quality testing and support the effective management of more challenging cases.

There will be a lead medical scientist or manager who is responsible for the day-to-day management of the department and has responsibility for supervision of non-medical staff.

Roles and responsibilities will be defined and should be incorporated into the laboratory quality manual.

5.2.4 Specimen reception

Standard operating procedures (SOPs) will be in place for handling CervicalCheck samples. Laboratories will accept orders via postal delivery and via electronic laboratory orders where applicable (followed by the receipt of the physical sample and form). For electronic orders the laboratory will be capable of extracting bar-coded information.

The laboratory will only accept programme samples from doctors or clinics that are notified to the laboratory by CervicalCheck. Only those samples accompanied by the programme's Cervical Cytology Form[9] or Cervical Cytology and HPV Form[10] will be accepted. Only those samples indicating either signed consent or prior consent by the woman will be accepted.

All forms will be date-stamped upon receipt.

Sample vials will be matched to the accompanying forms prior to labelling. To ensure a robust 'chain of custody' cross-checking of a minimum of three and preferably four patient identifiers will be performed. If the testing procedure requires initial aliquoting from the LBC vial then a second person verification should be in place to ensure a robust 'chain of custody'.

A discrepancy handling and resolution process will be in place to manage all discrepancies with CervicalCheck samples received. A CervicalCheck guidance document 'Cervical smear samples laboratory – samples receipt. Discrepancy handling and resolution guidance'[12] is available for laboratories contracted by the programme. Discrepancies with received samples will be recorded and the log will be made available to CervicalCheck. The format of the log will be approved by CervicalCheck.

Samples returned to ordering doctors or clinics will be traceable.

After verification of correct correlation of the sample vial with the corresponding form, and acceptance of the sample and form for processing, both will be labelled with a unique identification number (laboratory accession number).

The unique laboratory accession number for the sample must remain the same whether the sample is for cytology screening only, for HPV testing only, or for both cytology screening and HPV testing.

5.2.5 Data entry and notification to CervicalCheck

Data entry of the details recorded on the forms accompanying submitted sample vials will conform to CervicalCheck data capture requirements[8].

All relevant data recorded on the form by the smeartaker will be entered into the LIMS (refer to Cervical Cytology/Cervical Cytology + HPV/Cervical HPV Requests and Results[13]).

Samples will be assigned to the correct clinically responsible doctor or clinic (Registered Smeartakers – Types and Identification[14]).

Standard 5-2

Access to received HPV test order forms

Copies of all submitted HPV test order forms (HPV test only or combined cytology and HPV test orders), in electronic format and indexed by the laboratory accession number, shall be made available promptly to CervicalCheck.	100%, within 7 working days of acceptance.

Standard 5-3

Notification of sample receipt to programme

Samples, once accessioned, must be notified promptly by electronic means to CervicalCheck.	95% within 48 hours of receipt of sample. Min: 80% by 17:00 GMT next working day.

Note: A tracking system or log will be in place to verify that the number of electronic notifications sent to CervicalCheck on any given day equals the number of samples entered onto the LIMS that day. A weekly reconciliation of files sent and received will be in place between CervicalCheck and the laboratory.

Quality requirement

Programme ineligible samples

Samples identified by CervicalCheck as ineligible for the screening programme will not be processed. Certain samples that are not to be processed may have to be reported. These include expired vials and samples that are not processed but a report is sent to both CervicalCheck and the requesting doctor. Ineligible samples may be required to be returned to the ordering doctor or clinic.

5.2.6 Sample processing

The HPV test used will be chosen from those considered acceptable for use within the CervicalCheck programme and agreed by contract.

Analysers will be installed by the manufacturer's personnel. The installation will be in an appropriate environment to ensure accuracy and validity of results and to prevent contamination.

Periodic maintenance will be carried out by trained individuals as specified in the manufacturer's user manual. A log of maintenance will be maintained.

The laboratory must verify that instrument, analyser, and reagent performance meets the published specifications. Appropriate personal protective equipment and handling techniques will be employed to prevent contamination of samples.

Reagents must be within expiry date. Reagents and samples will be stored according to specified storage conditions. Only those reagents or consumables specified by the manufacturer will be in use.

Processing of samples will be carried out according to instrument user manuals and assay specific package inserts.

All laboratories providing HPV testing will include positive and negative internal quality control (IQC) samples as well as all required kit controls in every run. The quality of the analytical runs may be monitored using additional quality assurance (QA) guidelines such as the Westgard rules[15].

Quality requirement

Sample 'chain of custody'

Handling procedures will ensure a robust 'chain of custody' across all phases of the analysis, including specimen receipt, nucleic acid extraction, nucleic acid quantification, hybridisation/amplification, detection, documentation and storage. An audit trail will be in place for sample processing.

5.2.7 Proficiency and competency of staff

Laboratory staff implementing HR-HPV technology will have relevant experience in interpreting and troubleshooting molecular technologies. They will have appropriate training to include sample handling, analysis, quality control and health and safety.

Quality requirement

Continuing education

There will be protocols and practices in operation to demonstrate a system of both internal and external continuing education for scientific and medical staff reporting CervicalCheck cases.

5.2.8 Results management

For diagnostic purposes, results will be assessed in conjunction with the patient's medical history, clinical examination, and other findings. There will be a documented system in operation to detect and correct significant clerical and analytical errors, and unusual laboratory results, in a timely manner.

Quality requirement

Reporting HPV test results

HPV result codes will be reported with the detail and the format specified by CervicalCheck. Generally, the details required include: HPV test methodology, HPV test result, subtypes tested and reference range.

Quality requirement

Assignment of management recommendations

All cytology results will take the HPV test result into consideration and have a management recommendation accompanying the cytology pattern as a P and R code combination according to 'Cervical Cytology Management Recommendations Explanatory Guide'[16] and 'Cytology Terminology Table'[17] as appropriate.

Note: Where a combined cytology screen and HPV test is carried out, the management recommendation will be assigned using Cytology and HPV Recommendations Table for follow-up of women post-treatment, or similar CervicalCheck publication for other HPV test scenarios.

Quality requirement

Management recommendations with respect to screening history

Management recommendation will be correct for each result with respect to the screening history of the woman.

The screening history of the woman provided by the smeartaker via the Cervical Cytology Form[9] or Cervical Cytology and HPV Form[10] and CervicalCheck from the CSR (where such history is available) must be referred to and taken into account during the results process. This will ensure the correct management recommendation is assigned.

CervicalCheck uses the management recommendation accompanying results to issue appropriate correspondence to a woman advising her of her next recommended step in the screening programme.

Quality requirement

Check of result and recommendation

An independent check of the case result and management code will be in place, prior to report authorisation, to minimise the risk of error.

Quality requirement

Authorisation of results

Every result will be appropriately authorised before release. Every report will be checked for inconsistencies before authorisation. Reports will identity the cytotechnologist or medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

Quality requirement

Result codes notification to programme

Results, once authorised and released, will be issued in the agreed summary format as soon as possible by electronic means to CervicalCheck.

Standard 5-4

Laboratory response time (turnaround time [TAT])

Cytology results must be authorised, released and transmitted to CervicalCheck within the target turnaround time from sample validation by the programme.	95% within 10 working days.

Note: If the target for turnaround time (TAT) cannot be achieved for any period exceeding three working days, CervicalCheck will be immediately informed and a plan to remove the delay must be provided within one week.

Quality requirement

Adequacy of results reports

The contents of the results report to ordering doctors and clinics must be in accordance with the guidelines outlined in Cervical cytology/Cervical Cytology + HPV/Cervical HPV Requests and Results[13].

Standard 5-5

Results reports to ordering doctors or clinics

Results, once authorised and released, must be issued promptly to the ordering doctor or clinic.	99% to be received within 5 working days.

Note: The issuing of results must take account of the time taken for delivery of printed paper results (post or courier) to meet the target for receipt by the ordering doctor or clinic.

Quality requirement

Delivery of results reports to ordering doctors or clinics

Results reports will be issued to the correct ordering doctor or clinic. Documented processes are required to ensure that results are sent to the correct doctor and to handle discrepancies between the number of samples received and the number of reports transmitted.

Quality requirement

Results reports by electronic means

It is desirable that all results reports in addition to paper format be issued to ordering doctors or clinics and CervicalCheck in full electronic format via a nominated telecommunications pathway. The electronic format for results is HL-7 based and conforms to the laboratory result message specifications of HIQA's GP Messaging Standard[11].

5.2.9 Storage and archiving

The laboratory will ensure adequate administration and secure archiving and disposal of forms, samples, waste products and reports. Records will be stored to allow prompt retrieval if required.

Administration, archiving and disposal procedures will comply with accreditation standards and national legislation, including those relating to confidentiality and data security of personal health information.

Quality requirement

Access to materials

Laboratories are required to provide CervicalCheck access to materials including logs and records, on request.

5.2.10 Quality assurance and continuous improvement

Quality requirement

External quality assurance (EQA)

All laboratories providing HPV testing will participate, and show adequate performance, in an accredited external quality assurance (EQA) scheme. EQA samples will be analysed within the routine laboratory workload, by personnel who routinely test patient samples, using the same primary methods as for patient samples.

Standard 5-6

Quality metrics

A complete and accurate report containing prescribed quality metrics must be provided at regular intervals to CervicalCheck.	Complete data at least quarterly, within one month of end of period.

Note: The quality metrics collected during internal quality control procedures are used for monitoring, assessment, reporting, review and feedback purposes.

The quality metrics required are detailed in the current version of the 'HPV 1 Report'[18]. They include measures, which should be readily available from the laboratories internal quality control processes. Laboratories will have the ability to separate CervicalCheck workload from other workload(s) for statistical and monitoring purposes.

Quality requirement

Quality metrics improvement

Laboratories will undertake appropriate and timely measures to address performance issues that impact upon quality metrics and cause values outside of laboratory, national and/or international norms. EQA results will be evaluated on an ongoing basis, with prompt corrective action taken for unacceptable results.

Quality requirement

Quality assurance visits

Laboratories will accommodate on-site visits by NCSS-designated personnel for quality monitoring, audit and assurance purposes, providing access to personnel, resources, processes, documentation and results.

5.3 References

1. NHSCSP. (2012). Achievable standards, benchmarks for reporting, and criteria for evaluating cervical cytopathology. Third edition including revised performance indicators. NHSCSP Publication 1. Sheffield, NHS Cancer Screening Programmes.
2. NHS CSP (July 2011). Guide No. 3 HPV Triage and Test of Cure: - Draft Implementation Guide.
3. ISO (2012) Standard 15189: 2012 Medical laboratories – Requirements for quality and competence.
4. Data Protection Act 1988. Number 25 of 1988.
5. Data Protection (Amendment) Act 2003. Number 6 of 2003.
6. EU Directive 95/46/EC - The Data Protection Directive. Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.
7. The Clinical and Laboratory Standards Institute (CLSI) 2006. MM3-A2-Molecular Diagnostics Methods for Infectious Diseases; Approved Guideline. Second Edition.
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14. CervicalCheck registered smeartakers types and identification (CS/PUB/A-15).
15. Westgard rules – multirole quality control rules accessed at http://www.westgard.com/westgard-rules-and-multirules.htm 31 October 2013.
16. CervicalCheck cytology management recommendations explanatory guide (CS/PUB/LAB-1).
17. CervicalCheck cytology terminology table (CS/PUB/LAB-2).
18. Pathology laboratories HPV testing HPV 1 Report (CS/F/LAB-15).

Chapter 6

Quality assurance in colposcopy

6.1 Introduction

Colposcopy services play a key role in the success of any cervical screening programme by ensuring optimal management of women with detected smear test abnormalities. In particular, colposcopy services must ensure accurate diagnosis and effective treatment. Quality assurance for colposcopy services is therefore essential. Interventions must reduce the risk of cancer in these women while minimising the risk of any significant physical and psychosocial impact. The quality of any colposcopy service is reliant on the skill and judgement of the individual practitioners as well as adequately resourced, well organised administration.

This chapter provides requirements and standards for the provision of quality assured colposcopy services. It is based on the model of care agreed between the National Health Service Cervical Screening Programme, British Society of Colposcopy and Cervical Pathology (BSCCP) and the Royal College of Obstetricians and Gynaecologists (RCOG).

This edition of requirements and standards for colposcopy services operating within the CervicalCheck programme have been based on the following references:

- The first edition of the NCSS 'Guidelines for quality assurance in cervical screening'.
- European guidelines for quality assurance in cervical cancer screening.[1]
- The evolution of standards and guidelines in response to technological developments and research outcomes in other cervical screening programmes.
- The supplementary document - Organisational and Clinical Guidance for Colposcopy Services.[2]
- The activity and performance of colposcopy services collated since the commencement of CervicalCheck.

Tools for monitoring compliance with the requirements and standards include:

- Service standard operating procedures/process guidelines documented and in place.
- Service record of failsafe management.
- Local register of BSCCP certified colposcopists and trainers including BSCCP identities updated six monthly.
- Training logs.
- Attendance records[3], minutes of multi-disciplinary clinico-pathological meetings[4]
- Minutes of MDT operational meetings.
- Audit of waiting times/clinic schedules.
- Colposcopy monthly returns and extracts of colposcopy information.
- Analysis of data provided to the Cervical Screening Register (CSR) by cytopathology, colposcopy and histopathology services providers.
- Quality assurance visits.

6.2 Organisational requirements and standards in colposcopy

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

6.2.1 Facilities

Quality requirement

Access area

The colposcopy service should be provided in a dedicated outpatient facility, with a dedicated reception area and a dedicated waiting area for women. There should be clear signage from the hospital entrance to the colposcopy clinic.

Quality requirement

Clinical area

There should be a dedicated area for history taking and counselling which should ensure the privacy of the woman. There should be provision to enter the history onto the IT system in this clinical space. There should be adjacent toilet facilities for the woman. A separate recovery room/area should be available. There should be a private changing area for the woman.

Quality requirement

Equipment

There should be an examination couch capable of postural adjustment. There should be at least one working colposcope which should be maintained in accordance with the hospital guidelines on the maintenance of medical equipment. The colposcope should be linked to a camera to enable image capture. A monitor should be available to allow the woman to view the procedure. Images should be captured using the colposcopy management software. Resuscitation equipment should be available at the colposcopy clinic. Clinical and nursing staff should be trained in the use of the resuscitation equipment. A panic button should be accessible within the clinical room which provides communication with staff outside the clinical room. There should be a computer connected to the hospital network in the clinical room to facilitate data entry of clinical information.

Quality requirement

Administrative area

There should be dedicated office space to house the administrative support for the colposcopy service ensuring compliance with hospital health and safety guidelines. There should be space for secure storage of the colposcopy clinical records of all current colposcopy patients within this administrative area. There should be a provision to enter data into the colposcopy computerised management system from this administrative space. Computer and printer hardware as well as dedicated telephone and fax facilities should be available in this administrative space.

6.2.2 Governance

Quality requirement

Governance

The service should have regular (at least quarterly) operational meetings between nursing, hospital administration/managers and colposcopists. Management reports including numbers attending, waiting times and default rates should be reviewed at these operational meetings and appropriate corrective actions taken.

The service should have clinico-pathological meetings on at least a monthly basis to enable efficient decision making and timely discussion of challenging cases.

Colposcopy clinics should be scheduled in sessions of 3 hours to accommodate appointment slots of 20 minutes (30 minutes if a trainee is present) per room to maximise throughput while minimising waiting times at the colposcopy service.

6.2.3 Staff

Quality requirement

Staff

Colposcopy should be delivered by a defined team including medical, nursing and administrative staff. Colposcopists should be trained and certified by a recognised certification and recertification body such as the British Society of Colposcopy and Cervical Pathology (BSCCP) and should appear as such on the list of certified colposcopists of the certification body. A local register of certified colposcopists and trainers should be maintained at each service and updated on a six monthly basis.

Quality requirement

Lead colposcopist

There should be a lead colposcopist with a sessional commitment of one session per week to oversee continuous quality improvement and to troubleshoot any clinical or administration issues.

There should be adequate dedicated nursing staff available to the service as agreed in the memorandum of understanding for each service. A clinical nursing care assistant should be available to facilitate cleaning and enhance the turnaround time between patients at the colposcopy clinic. There should be enough dedicated administrative support available as agreed in the memorandum of understanding to provide administrative support to the service. There should be a separate nurse-led cytology and HPV clinic for the follow-up of both treated and untreated patients.

6.2.4 Information technology

Quality requirement

Infrastructure

A computerised colposcopy management system should be installed at the colposcopy clinic. This system should be networked in an accessible form from all areas in use by the team. The colposcopy management system should be interfaced with the hospital patient administrative system and the hospital appointments system.

Adequate numbers of concurrent user licences should be available to enable efficient data entry by all necessary staff.

Quality requirement

Training

Training in the use of the colposcopy management system should be available.

Quality requirement

Utilisation

The colposcopy service should generate appointment letters from the colposcopy management system. The IT system should be used for specimen management using a defined report which lists specimens taken at each clinical session. The IT system should be used to store image and video data. The IT system should be used to enter the results of any tests. The IT system should be used to enter follow-up and management plans. The IT system should be used to generate result and management plan letters to both GPs and the woman. The IT system should be used to check failsafe processes. The IT system should generate quarterly mandatory audit returns.

Quality requirement

Update records to CervicalCheck

All updates to records of women consented to participate in CervicalCheck should be transmitted to the CSR on a daily basis.

Controls should be in place to ensure that mandatory fields cannot be overwritten in the colposcopy computer systems. All mandatory fields must be complete to allow the transfer of files and updates to the CSR.

Quality requirement

Error files

Error files that are returned from the CervicalCheck CSR should be checked on a regular basis using the broker log. All error files sent by the CSR should be actioned in a timely fashion and corrected updates resent to the CSR.

6.2.5 Systems management

Quality requirement

Management of new referrals

There should be a defined process for the management of new referrals. There should be a defined process for informing women of the appointment by letters from the colposcopy management system. Services should use the facilitated referral process and inform the programme via a "red flag alert" if it is unable to process appointments within these timeframes and needs the programme to redirect new referrals to other services.

Standard 6-1

Waiting times

Women referred to colposcopy should be offered a timely appointment following receipt of referral.	> 90%
• Women with a clinical suspicion of invasive cancer or adenocarcinoma in situ	within 2 weeks.
• Women with a smear test suggestive of CIN2 or CIN3 (HSIL)	within 4 weeks.
• All other women	within 8 weeks.

Management of women who default

There should be a defined process for the management of women who default from attendance at the colposcopy clinic.

Standard 6-2

Women who default

The percentage of women who do not attend and who do not notify the colposcopy service should be maintained at a low level to maximise the efficiency of the colposcopy service and to avoid the loss of women to follow-up.	< 10%

Quality requirement

Management of specimens

There should be a defined process for tracking all specimens to ensure that all are correctly delivered to the laboratory in a timely fashion (within one week).

Quality requirement

Management of test results

There should be a defined process for tracking all test results to ensure that all are received by the colposcopy service. There should be a defined process for the review of the result in conjunction with the medical record to decide the most appropriate course of action based on the results. The defined process for review of results should include a method of fast tracking results suggestive of invasive cancer.

Quality requirement

Provision of information

All women should be sent clinic-specific information on colposcopy in advance of appointments. Clinics which operate a 'select and treat' policy should send appropriate information regarding treatment to the patient in advance of the appointment.

Standard 6-3

Information to women	
Women should be sent a personalised invitation to colposcopy in advance of attendance.	> 90% within 2 weeks of receipt of the referral

Quality requirement

Communication of results to the woman and to the referring doctor (negative and abnormal)

There should be a defined process to ensure that all test results and management plans are communicated to both the woman and the referring doctor.

Standard 6-4

Communication of results and management plans	
Information on results of investigations should be communicated to the woman and to the referring doctor in a timely manner.	> 90% within 4 weeks of the woman's attendance

Quality requirement

Audit and systems review

There should be a defined process whereby computerised failsafe checking procedures are performed on a monthly basis at least. The colposcopy team should meet to review quality assurance processes and identify any opportunities for improvement on at least a quarterly basis. The colposcopy statistical returns should be generated on a quarterly basis and reviewed by the team.

Quality requirement

Documentation

The colposcopy service should have clinical and administration guidelines and procedures which have been agreed by both the colposcopy team and the hospital administration.

Quality requirement

Follow-up

There should be a defined process for ensuring that all patients referred with abnormal cytology should have at least one follow-up smear test at the colposcopy clinic prior to discharge.

6.2.6 Data quality

Electronic updates from colposcopy to the CSR are really important in updating the woman's record and ensuring the correct follow-up. Services should make sure that data capture is accurate and complete to enable correct transfer of the information.

Quality requirement

Data capture – demographics

Every woman's record sent to the CSR must contain the following demographic details to allow the CervicalCheck programme to uniquely identify and accurately match the woman on the CSR.

- **Minimum Demographics:** Every woman's record sent to the CSR must contain at a minimum, the forename, surname, date of birth and address to uniquely identify the woman.
- **Additional Demographics:** In addition to the minimum demographics each record should include as many of the following elements where available: surname at birth, mother's maiden name, PPS number, CSPID, Colposcopy Reference Number and Telephone Number.

Quality requirement

Confirmation of demographic details

Women's demographic details should be confirmed at each attendance and patients reminded to inform the clinic of change of address whilst attending. The computer record should be updated to reflect same.

Quality requirement

Notification of colposcopy procedures/outcomes to CSR

Every colposcopy update sent to the CSR should contain the following information:

a) For those who fail to attend the colposcopy appointment, the appointment status must be updated with one of the following scenarios:
   - Cancelled
   - DNA (Did Not Attend).

b) For those who do attend the colposcopy appointment, all of the following should be updated:
   - Appointment Status
   - Procedure
   - Examiner Identification
   - Outcome.

Quality requirement

Smeartaking - Data Recording

When carrying out smear tests in colposcopy the Cervical Cytology Form[5] should record sufficient, accurate details to enable accurate matching of the woman with her records on the CSR.

6.3 Clinical requirements and standards in colposcopy

6.3.1 Diagnosis

Standard 6-5	**Positive predictive value** Compliance between colposcopic impression of high grade disease and histologically proven high grade CIN.	> 65%
Standard 6-6a	**Biopsy** A biopsy should be performed in the presence of an abnormal Transformation Zone (TZ).	>90%
Standard 6-6b	**Biopsy** Reasons for not performing a biopsy in the presence of an abnormal TZ at the first visit e.g. pregnancy should be recorded.	> 95%
Standard 6-6c	**Biopsy** Women should have a biopsy performed before ablative or destructive treatment and the result should be available before the treatment is carried out.	> 95%
Standard 6-6d	**Biopsy** Where a lesion extends into the endocervical canal and the upper limit is not seen (Type 3 TZ), an excisional biopsy should be performed in preference to a punch biopsy.	>95%
Standard 6-6e	**Biopsy** Biopsy specimens should be suitable for histological diagnosis.	> 95%

6.3.2 Treatment

Standard 6-7a	**Who to treat** Women with high grade CIN (CIN 2/3) or AIS confirmed on a diagnostic biopsy should have a treatment performed. Exceptions would include pregnancy. If conservative management for a high grade lesion is being considered this should be discussed at CPC meeting.	>90%
Standard 6-7b	**Who to treat** Women who present with a high grade cytological abnormality and who have no colposcopic abnormality identified on a fully visible Transformation Zone including examination of the vagina should have the smear test reviewed by the cytopathologist at a CPC meeting and if high grade changes are confirmed an excisional treatment should be performed.	>90%
Standard 6-7c	**Who to treat** Women who present with a high grade cytological abnormality and who have an inadequate colposcopy (Type 3 TZ) should have an excisional treatment performed.	>90%
Standard 6-7d	**Who to treat** Women referred with high grade cytology and who have CIN1 or less diagnosed on a diagnostic biopsy should be managed carefully and should be treated if there is a subsequent cytological abnormality (LSIL at least) or if is there is a positive high risk HPV infection at 12 months. Where serious disparity between colposcopy and cytology exists and treatment is not otherwise indicated then the case should be discussed at the CPC meeting.	>95%

Standard 6-8a	**When to treat** Treatment at the first visit to colposcopy should be considered for women who present with a high grade cytological abnormality and who have suspected high grade disease at colposcopy ('select and treat'). These women should have appropriate pre-visit information regarding the possibility of treatment.	>80%

Standard 6-8b	**When to treat** Treatment at the first visit to colposcopy should not be performed on women who present with low grade cytological change (even if there is a colposcopic suspicion of high grade disease) except in special circumstances.	<10%

Quality requirement	**Pre-treatment** All women who require treatment must be informed about the procedure and their written or verbal consent recorded. Women who require treatment must have a prior colposcopic assessment and all treatments must be recorded. Treatments must be performed in suitably staffed and equipped clinics.

Standard 6-9	The majority of women should have treatment performed as an outpatient under local anaesthesia.	≥90%

Choice of treatment: Ablative treatment is only suitable when:

- The entire Transformation Zone is visualised
- There is no evidence of either glandular or invasive disease
- There is no discrepancy between the cytology and the biopsy
- There has not been a previous treatment.

Standard 6-10a	**Excision – Removal of the Specimen** The specimen should usually be excised as a single specimen to maximise the interpretation of margins.	> 90%

Standard 6-10b	**Excision – Removal of the Specimen** Excision of ectocervical specimens should aim for a thickness of at least 7 mm and not greater than 12mm thickness to overcome the potential for residual disease in the crypts.	> 95%

Standard 6-11a	**Results** Women treated by excisional technique at first visit should have CIN on histology.	> 90%

Standard 6-11b	**Results** Women treated by excisional techniques should have CIN on histology.	> 85%

Standard 6-12a	**Repeat excision** Women over the age of 50 years who have CIN3 at the endocervical margin and all women with AIS at a margin should have a repeat excision performed to obtain clear margins if satisfactory cytology and colposcopy cannot be guaranteed.	> 90%

Standard 6-12b	**Repeat excision** Women treated by excision for suspected high grade disease (CIN 2/3 or AIS) and who have no significant abnormality on histology should be discussed at the colposcopy CPC meeting before repeat colposcopy including examination of the vagina and consideration of a repeat excision.	> 90%

6.3.3 Follow-up after treatment

Standard 6-13a	**Follow-up after treatment** At least two follow-up smear and HPV tests should be performed at the colposcopy clinic within the first 18 to 24 months.	>90%
Standard 6-13b	**Follow-up after treatment** The diagnosis of residual or recurrent CIN within twenty-four months of treatment should be very low.	<5%
Standard 6-13c	**Follow-up after treatment** The results of the smear test and HPV tests on two separate occasions one year apart at colposcopy should facilitate discharge of the women to routine screening in the majority of cases.	>80%
Standard 6-13d	**Follow-up after treatment** Follow-up should start between 6 and 8 months following treatment.	>90%
Standard 6-13e	**Follow-up after treatment** Follow-up after a hysterectomy showing completely excised CIN should include 2 negative vault smear and HPV tests at 12-month intervals at colposcopy before discharge from CervicalCheck.	>95%

Standard 6-13f	**Follow-up after treatment** Follow-up after a hysterectomy showing incompletely excised CIN should continue as if the cervix were still in situ.	>95%

Standard 6-14a	**Follow-up after treatment** Women with persistent high risk HPV infection at eighteen months post treatment require annual smears for the subsequent 10 years before returning to routine screening.	>95%

Standard 6-14b	**Follow-up after treatment** Women who are HPV negative 18 months post treatment and who have a smear test which is normal or shows ASCUS should be discharged to routine screening.	>95%

6.3.4 Follow-up of women who have not been treated

Standard 6-15	**Women who present with high grade cytological abnormality** If the colposcopy suggests low grade disease and conservative management is preferred, multiple biopsies should be performed.	>95%

Standard 6-16a	**Women who present with low grade cytological abnormality** If the colposcopy is satisfactory and normal, a smear and HPV test should be repeated in twelve months.	>95%

Standard 6-16b	**Women who present with low grade cytological abnormality** If the colposcopy is atypical, a biopsy should be performed. If diagnosis is CIN 1 or less a smear and HPV test should be repeated in twelve months, except in special circumstances (patient choice, risk of default).	>90%
Standard 6-16c	**Women who present with low grade cytological abnormality** If persistent abnormality or HPV positive for high risk HPV at 12 months repeat colposcopy with possible treatment should be performed.	>90%
Standard 6-16d	**Women who present with low grade cytological abnormality** The woman should be discharged from the colposcopy clinic for routine screening if the HPV test is negative for High risk HPV and if the smear test is reported as ASCUS or normal.	>90%
Standard 6-17a	**Pregnant women** Women who are pregnant should have a colposcopy performed, using the same criteria as for women who are not pregnant.	>95%
Standard 6-17b	**Pregnant women** Biopsy and treatment is usually deferred until the postpartum period except where there is a suspicion of invasive disease.	>80%
Standard 6-17c	**Pregnant women** If low grade CIN is suspected at colposcopy a repeat colposcopy appointment should be made for the post partum period.	>95%

Standard 6-17d	**Pregnant women** If high grade CIN is suspected the colposcopy should be repeated at the end of the second trimester as well as the post partum period.	>95%

Standard 6-17e	**Pregnant women** If there is a suspicion of invasive disease a biopsy must be performed. This biopsy should be a wedge or small loop biopsy and not a punch biopsy.	100%

6.3.5 Discharges from colposcopy

Quality requirement

Discharge recommendations

Discharge recommendations should be selected based on the table provided in the colposcopy guidance document[2]. For non standard cases, the number of annual smear tests required post colposcopy before discharge to routine screening is determined by the treating clinician and will be followed by the programme laboratory.

Quality requirement

Discharge correspondence

A process should exist to ensure that the discharge recommendation (post colposcopy screening requirements) sent to the CSR reflects the discharge recommendation on the discharge letter to the referring doctor.

Quality requirement

Communication to referring doctor

All communication from the colposcopy service in relation to diagnosis/treatment and discharge of a woman must be sent to the referring GP or referring Clinic (WWC/FPC/Gynaecology/STI).

This is required so that the CervicalCheck programme office can ensure which doctor to send a failsafe letter to in the event of non compliance. A copy of the correspondence should only be sent to the woman's own GP (if they are not the referring doctor) at her request and with her consent.

6.3.6 Clinico-pathological conferences (CPC)/Multi-disciplinary team (MDT) meetings

Quality requirement

Participation in CPC/MDT meetings

All of the colposcopists should be invited to monthly clinico-pathological meetings organised by the service and should attend a minimum of 50 per cent. Histopathology and cytopathology representation is essential.

Quality requirement

Protocol for CPC/MDT meetings

Participation, including a signed record of personnel attending and operational decisions, shall be recorded. Participants must be subject to national legislation relating to confidentiality, professional registration and data security of personal health information. The outcome of the discussions and any management plans should be inputted into the patient medical record. The protocol should be consistent with the provisions of Guidance for CPC/MDT Meetings for colposcopy services[4].

6.3.7 CervicalCheck cancer review process

The CervicalCheck cancer review process reviews[6] notified cases of invasive cervical cancers. It operates as a feedback and learning process within quality assurance, contributing to potential continuous improvement measures.

Quality requirement

Notification

The colposcopy should notify the details of women with a diagnosis of invasive cancer to the programme.

Quality requirement

Review of cases

All cancers should be reviewed at both the colposcopy and oncology multi-disciplinary meetings. In addition, further reviews may be requested by CervicalCheck, and in some cases services will be asked to provide case material for cases identified as warranting independent third-party review in line with the cancer review process.

6.3.8 Quality assurance and continuous improvement

Standard 6-18	**Quality metrics** A complete and accurate report containing prescribed quality metrics shall be provided at regular intervals to CervicalCheck.	Information is submitted to CervicalCheck on a monthly and quarterly basis

Quality requirement

Quality metrics improvement

Colposcopy services will undertake appropriate and timely measures to address performance issues that impact upon quality metrics and cause values outside of national norms.

Quality requirement

Quality assurance visits

Colposcopy services shall accommodate on-site visits[7] by CervicalCheck-designated personnel for quality monitoring, audit and assurance purposes, providing access to personnel, resources, processes, documentation and results.

6.4 References

1. Arbyn M., Antilla A., Jordan J., Ronco G., Schenck U., Segan N., Wiener H.G., Herbert A., Daniel J., von Karsa L. (2008) European guidelines for quality assurance in cervical cancer screening [2nd Edition]. International Agency for Cancer Research and EU, Health & Consumer protection Directorate-General.
2. CervicalCheck Organisational and clinical guidance for colposcopy services (CS/PUB/CLP-7).
3. Colposcopy service CPC/MDT meeting attendance log (CS/F/CLP-7).
4. CervicalCheck Guidance for CPC/MDT meetings for colposcopy services - planning successful collaboration for web-based interactive meetings between colposcopy, histopathology and cytology (CS/PUB/CLP-2).
5. CervicalCheck Cervical Cytology Form (CS/F/LAB-2).
6. Process for the review of incident cases of cervical cancer following the introduction of a national cervical screening programme (CS/PUB/PM-10).
7. National Cancer Screening Service quality assurance protocol for systematic review visit to colposcopy service.

Chapter 7

Quality assurance in histopathology

7.1 Introduction

Cervical cytology currently represents the primary screening method. Colposcopy locates the most abnormal areas of the cervix. Histopathology provides the final diagnosis of cervical neoplasia, forming the basis for which treatment is planned.

In addition, histopathology:

- Serves as the 'gold standard' for quality control of cytology and colposcopy
- Is the source of diagnostic data stored at the National Cancer Registry Ireland (NCRI) and used for evaluation of screening programmes
- Is required to diagnose the degree of abnormality in women with persistent low grade abnormalities including HPV lesions, as well as high grade lesions (squamous and glandular)
- May also diagnose either glandular abnormalities or high grade CIN, adenocarcinoma-in-situ (AIS), or invasive cancer.

As in cytopathology, the sample pathway for histopathology can be subdivided into three key stages:

1. **Sample taking, sample transport and receipt of sample in the laboratory (pre-analytical)**

   The accuracy of the histopathological diagnosis of tissue specimens depends on adequate quality samples, obtained by colposcopically directed punch biopsies (with endocervical curettage, if necessary) or excision of the Transformation Zone (TZ) or conisation.

2. **Sample processing and interpretation (analytical)**

   Accurate histopathological diagnosis further depends on appropriate macroscopic description, technical processing, microscopic interpretation and quality management correlating cytological and histological diagnosis.

3. **Report generation (post-analytical)**

   It is important to recognise that the interpretative reports provided in histopathology and cytopathology are the opinion of the reporting pathologists. There is therefore a subjective element in the content of any report. Some diagnoses require the combined input of a colposcopist, cytologist and histopathologist. There are a variety of reasons why clinical appearances, cytology, biopsy and excision results may appear discrepant. Multi-disciplinary team (MDT) meetings can often resolve perceived discrepancies. If a colposcopist is unsure of the significance or meaning of a report or feels that a report is incorrect, they should contact the issuing laboratory or reporting pathologist. Histopathologists should remain abreast of current and emerging interpretation guidelines[1, 2, 3].

The quality requirements and standards for histopathology laboratories providing services to CervicalCheck are set with regard to:

- NCSS Guidelines for Quality Assurance in Cervical Screening (first edition)
- 'Guidelines for the Implementation of a National Quality Assurance Programme in Histopathology - Faculty of Pathology, Royal College of Physicians in Ireland'[1]
- Standards and guidelines, revised in response to technological developments and research outcomes, in other cervical screening programmes, with particular reference to histopathology reporting (NHS CSP[2], Royal College of Pathology[3])
- The activity and performance metrics for histopathology collated since the commencement of CervicalCheck.

Compliance with the requirements and standards is measured and monitored by:

- Quality metrics reports by histopathology laboratories
- Analysis of data provided to the Cervical Screening Register (CSR) by cytopathology, colposcopy and histology service providers
- Quality assurance site visits to laboratory service providers
- Monitoring and review of operational activity and performance.

7.2 Quality requirements and standards

Ensuring quality assurance in service delivery comprises compliance with both quality requirements and quality standards.

Quality requirements are stated as a description. There are no targets associated with a requirement as service providers must fulfil the requirement.

Quality standards are stated as a description of an activity with a measurable level of performance, with an associated target for achievement. The standards are designed to be measurable i.e. quantitative with criteria that are valid, reliable and feasible.

7.2.1 Organisational requirements

Standard 7-1

Accreditation

The laboratory must have and maintain accreditation to ISO15189 standard[4] or equivalent, certified and documented by an approved accreditation body. The scope of the laboratory accreditation must include histopathology.	External accreditation at least once every 2 years.

Note: Laboratory accreditation covers facilities, staff qualifications, training and competencies, equipment, laboratory information systems, and quality management systems.

Quality requirement

Data protection

All data protection issues (storage, access, security, confidentiality and data transfer) will be compliant with Irish and European legislative instruments: the Data Protection Act 1988[5], the Data Protection (Amendment) Act 2003[6] and any future revisions or amendments of the Act as well as the EU Directive 95/46/EC - The Data Protection Directive[7].

Laboratories must have facilities, systems and procedures to ensure the secure exchange of personal health Information and confidential data. These provisions must apply equally to data held in paper and in computer formats. A Virtual Private Network (VPN) must be installed between the laboratory or hospital and the programme operations office for the secure exchange of electronic data.

Quality requirement

Health and safety compliance

The laboratory will be compliant with all national legal and statutory health and safety requirements.

Quality requirement

Quality management system (QMS)

The laboratory will have a quality management system (QMS) in place as required by their accreditation standard. The laboratory should have a designated person responsible for quality management who will liaise with CervicalCheck to resolve any quality issues that may arise.

Any complaints in relation to the histopathology service within the screening programme will be notified to CervicalCheck.

Quality requirement

Laboratory information management system (LIMS)

- **General:** An appropriate laboratory information management system (LIMS) will be installed and be in operation in the laboratory. The LIMS will be in a secure facility with the provision for adequate back-up arrangements. Access to the LIMS will be by privilege-level access control. The LIMS will be capable of generating periodic quality metrics and audit returns to the NCSS. Ideally, there should be an electronic linkage to CervicalCheck to ensure prompt retrieval of results.
- **Data capture:** The LIMS will be capable of recording the minimum dataset from the sample and request form.
- **Reporting:** The LIMS will be capable of recording test results including the identity of the reporting pathologist(s). The LIMS will be capable of recording and storing SNOMED codes for results.
- In addition the laboratory information system will:
  - Link multiple test results for the same patient
  - Provide easy access to details about previous cervical histology of the patient
  - Provide the data necessary for evaluation of the CervicalCheck programme.

Quality requirement

Changes to service capacity, capability or conformance to quality assurance (QA) standards

Any changes that have or could have an impact on any aspect of the laboratory services, including laboratory accreditation status, processes, system procedures, analysis, and reporting should be advised in advance to CervicalCheck.

Quality requirement

Health agencies and authorities

Laboratories will comply with all requests for data or reports by Irish health agencies and authorities, including the Department of Health and the National Cancer Registry Ireland (NCRI).

7.2.2 Laboratory facilities

All laboratories will provide appropriate facilities. These will include appropriate areas for sample reception, cut-up, processing, reporting, typing and authorisation.

7.2.3 Staff qualifications

Scientific, medical and non-medical staff will be qualified for the positions they hold according to national requirements to practice. All equipment will be maintained and used only by laboratory staff that are competent to carry out such tasks.

The histopathology laboratory will be led by a medically qualified consultant who works in that discipline on a regular basis. All samples will be reported by a medically qualified consultant.

There will be a lead medical scientist who is responsible for the day-to-day management of the department and who has responsibility for supervision of non-medical staff.

7.2.4 Specimen reception

Standard operating procedures (SOPs) will be in place for handling CervicalCheck samples.

For the purposes of data capture, samples originating from CervicalCheck colposcopy services must be segregated from samples from other sources. This may be via the programme's Cervical Histology Form[8] (where applicable) or by an accredited laboratory form where the origin of a sample is clearly identifiable. The issue of consent by the woman should be incorporated into the processes for sample data capture and data exchange.

All cervical histology forms will be date-stamped upon receipt.

All histopathological specimens must be received in either 10 per cent buffered formalin or as fresh samples and in an appropriate specimen container.

Sample containers will be matched to forms prior to labelling. Cross-checking of a minimum of three patient identifiers will be performed to ensure correct identification.

A discrepancy handling and resolution process will be in place to manage all discrepancies with CervicalCheck samples received.

After verification of correct correlation of the sample vial with the corresponding Cervical Histology Form, and acceptance of the sample and form for processing, both will be labeled with a unique identification number which is generated by the LIMS. The sample will be labeled on the top and side of the specimen container.

7.2.5 Data entry and notification to CervicalCheck

Relevant clinical details recorded on the Cervical Histology Form[8] will be recorded. Notification and result files should be sent to CervicalCheck on a regular basis. A periodic reconciliation of files sent and received should be in place between CervicalCheck and the laboratory.

7.2.6 Assessment of the sample (cut-up)

The cut-up of the histopathological specimens will be performed either by a laboratory scientist, pathologist or anatomic pathology technician. The RCPath Dataset for Histological Reporting of Cervical Neoplasia[3] can be used to guide cut-up procedures.

Specimen description and sampling will be done in such a way as to facilitate microscopic reporting (and pathological staging). As margin involvement may be associated with persistent or recurrent disease, every effort will be made to identify whether margins are involved or are free of disease.

Laboratories may use different means (including inking, where required) when assessing margins.

Quality requirement

Sample 'chain of custody'

Handling procedures will ensure a robust 'chain of custody' across the specimen pathway. These involve the cross-checking of a minimum of three patient identifiers at each stage, to typically include name, hospital number and accession number.

Slide labels will include patient surname in addition to the accession number.

Quality requirement

Cervical biopsy (not otherwise specified), wedge biopsy and cervical punch biopsy

Careful handling of specimens is recommended to prevent surface trauma and disruption or loss of surface epithelium.

All tissue will be embedded in such a way as to minimise any loss of tissue during processing. Macroscopic description should include measurements and number of fragments.

Quality requirement

Endocervical curettage

The aggregated size (in three dimensions) of the sample is recorded. All tissue will be embedded in such a way as to minimise any loss of tissue during processing.

Quality requirement

Cervical cone biopsy and cervical loop biopsy/large loop excision of the Transformation Zone (LLETZ), needle excision of the Transformation Zone (NETZ), straight wire excision of the Transformation Zone (SWETZ) and Cone

Macroscopic description should include measurements in three dimensions. Care may be needed to ensure that the correct cut face is placed face down in the cassette.

These specimens will be blocked in their entirety. Cassettes will be separately identified, with a block designation to indicate their origin, if required.

Quality requirement

Trachelectomy

Macroscopic description will include measurements in three dimensions. Bearing in mind that margin involvement will influence further treatment, sampling will be directed in such a way as to indentify the final surgical margin on microscopy (where possible). Inking may be considered.

In radical trachelectomy, the vaginal and parametrial margin should be sampled in such a way as to allow a microscopic description of differential margin status.

Quality requirement

Lymph nodes

Where submitted, a gross description will take place with any pertinent macroscopic description. All identified lymph nodes will be submitted for microscopic examination.

Quality requirement

Uterus

Macroscopic description including measurements in three dimensions will be entered into the LIMS (via electronic or manual dictation system).

The resection margins will be identified appropriately (e.g. vaginal, radial resection margin of cervix, parametrium etc.).

Macroscopic description will include a description of any lesion (with measurement).

In the case of radical hysterectomy, any resected lymph nodes must be described, measured and counted (and designated according to the anatomical site from which they have been removed).

Specimen dissection and block selection will be carried out in accordance with an agreed standard. Templates exist to guide specimen dissection and sampling and can be used where necessary e.g. the RCPath Dataset for Histological Reporting of Cervical Neoplasia (3rd edition) April 2011[3].

7.2.7 Sample processing

Appropriate and standardised procedures will be in place for specimen processing. Quality management systems will surround these procedures

7.2.8 Sample embedding

Dedicated facilities will be provided for sample embedding and a record will be kept of any tissue that does not survive the tissue processing schedule.

7.2.9 Sample sectioning

Appropriate procedures will be in place for sample sectioning. Health and safety procedures will be followed at all times to prevent cuts from microtome blades.

Quality requirement

Cervical biopsy (not otherwise specified) and cervical punch biopsy

In general, it is recommended that three levels of such biopsies are cut.

Quality requirement

Cervical cone biopsy and cervical loop biopsy/large loop excision of the transformation zone (LLETZ), needle excision of the transformation zone (NETZ), straight wire excision of the transformation zone (SWETZ) and Cone)/cervical wedge biopsy/endocervical curettage (ECC)/uterus

A single level from each block may be likely to suffice initially, but further levels may be required by the pathologist.

7.2.10 Slide staining

Appropriate procedures should be in place for slide staining. Typically this will be Haematoxylin and Eosin.

Special stains and immunohistochemical stains will be employed as required by the pathologist. Stains, reagents and protocols will be prepared and used according to manufacturer's instructions with appropriate regard to both positive and negative control slides.

Internal technical quality assurance checks will be carried out routinely including quality of staining and quality of preparation.

7.2.11 Proficiency and competency of staff

Quality requirement

All staff

All staff will be competent to carry out their roles. Competency will be maintained by regular training and education. Training and competency records should be retained and available for review.

Quality requirement

Pathologists

All pathologists will participate in continuing medical education (CME) as required by Part 11 of the Medical Practitioners Act 2007 – Maintenance of Professional Competence[9].

Quality requirement

Lead medical scientist, manager, supervisory scientific staff

The lead medical scientist will be responsible for maintaining a high quality service. Sufficient supervisory scientific staff will be available to provide satisfactory supervision for the training, service development and quality control of staff.

Quality requirement

Internal quality control

Microscopic diagnosis is crucially dependant on quality control.

Methods used for quality assessment will incorporate a process of continuous dialogue within the laboratory and improve individual histopathology reporting accuracy.

Internal quality control of reporting can be monitored by a variety of methods and could include:

- Performance evaluations
- Periodic audit of histopathology outcomes
- Monitoring of non-conformities
- MDT review of slides
- Monitoring histopathology detection and reporting rates
- Correlation of cytology with clinical/histological outcome.

Pathologists will participate in regular clinico-pathological conferences (CPC)/multi-disciplinary team (MDT) meetings[10].

Quality requirement

Continuing education

Continuing education will be facilitated with evidence of internal and external educational activities.

7.2.12 Microscopy and reporting of results

The reporting of the histopathological specimens will be performed by a pathologist. The relevant RCPath Dataset (currently Histological Reporting of Cervical Neoplasia (3rd edition)[11] can be used as a reporting guide.

All histopathology reports must be authorised by a consultant pathologist (electronic and/or manual).

All histopathological results must be entered onto a computerised system (laboratory information management system [LIMS]) to allow quality assessment. Amended reports and supplementary reports will be auditable.

Reports will record the origin of the specimen, identify the tissue components that are present, provide a macroscopic description and microscopic diagnosis along with the identity of the reporting pathologist.

The microscopic diagnosis will record all grades of squamous and/or glandular intra-epithelial neoplasia, and invasive lesions.

The distribution of a lesion will note if an orientated specimen has been submitted.

Any invasive lesions are classified and graded according to national protocols and guidelines.

Where an excision procedure has been undertaken, any microscopic report will attempt to indicate whether or not the squamous or glandular lesion has been completely excised.

In the case of radical trachelectomy, this will include the vaginal and parametrial margins. In the case of radical hysterectomy, the report will contain specific comment on resected lymph nodes, including site designation, number (in total) and number involved by tumour (if applicable).

Features that impair interpretation will be recorded.

Other significant pathologic features, such as significant inflammatory changes will be recorded.

When a biopsy fails to reveal the source of the abnormal cells in a smear test, it is important to differentiate between a biopsy that is technically adequate but fails to identify a lesion, and a biopsy that is technically inadequate.

All reports will be coded (typically using standardised SNOMED nomenclature[12]) to allow data collection.

Quality requirement

Authorisation of results

Every result will be appropriately authorised before release. Every report should be checked for inconsistencies before authorisation.

Quality requirement

Recording of results

Results details will include at least:

- Patient identification data
- Name and address of the laboratory
- Name of requesting physician
- Laboratory ID number
- Date of specimen procurement (specimen date)
- Date of arrival of the specimen in the laboratory
- Sample type
- Anatomical site of origin
- Relevant clinical details
- The results of the laboratory examination in accordance with the current standard classification system and data format, including a judgment of the quality and adequacy of the histopathological slide (if necessary), date of authorisation of the final report, and name of pathologist who has evaluated the sample.

Standard 7-2

Turnaround time (TAT):

Time between date of reporting results of the specimen from date of specimen arrival within the laboratory.	> 90% within 4 weeks of the woman's attendance
- Small specimens	At least 80% within 10 days.
- Large specimens	At least 80% within 14 days.

Note: Biopsies are performed on small specimens (<3 blocks). LLETZ, cone, trachelectomy, hysterectomy are performed on large specimens.

Standard 7-3

Results reports

Results, once authorised and released, must be issued promptly to the ordering doctor or clinic.	100% to be received within 5 days of report being authorised.

Quality requirement

Delivery of results reports to ordering doctors or clinics

Results reports will be issued to the correct ordering doctor or clinic. The laboratory will ensure that an appropriate delivery mechanism (for reports) is in place.

Quality requirement

Review requests and amended reports

Laboratories will have procedures in place to manage and respond to requests for second opinions and to issue amended or addendum reports as necessary. Additional or amended reports, once authorised and released, must adhere to the same standards and targets.

7.2.13 Archiving

Administration, archiving and disposal procedures will comply with accreditation standards and national and regional legislation, including that relating to confidentiality and data security of personal health information and disposal of hazardous medical waste or chemicals.

Standard 7-4

Storage and archiving

Secure archiving of cervical histology forms, blocks, slides and written and/or computerised reports is required for specific retention periods.	100% to be received within 5 days of report being authorised.
Cervical histology forms or their electronic equivalent	Until authorisation.
Specimens	Until authorisation.
Blocks, Slides, Reports	30 years

Note 1: Cervical histology forms may be in paper format or in their electronic equivalent, as per local accredited practice.

Note 2: All slides/blocks will be stored in conditions adequate for preservation.

Note 3: Records will be stored to allow prompt retrieval if required.

Quality requirement

Specimens retained and for disposal

Logs of specimens retained and for disposal will be maintained. Samples will not be disposed of prior to final report authorisation by the pathologist. Retention of specimens will comply with relevant legislation.

Quality requirement

Access to materials

Laboratories are required to provide CervicalCheck access to materials including slides and records on request.

7.2.14 Clinico-pathological conferences (CPC)/multi-disciplinary team (MDT) meetings

There are a wide variety of reasons for cases to be included in CPC/MDT meetings[10]. Cases discussed may include perceived discrepancies between cytology, histology and clinical appearances.

Quality requirement

Participation in CPC/MDT meetings

Histopathologists (with or without other scientific staff members) are integral participants in CPC/MDT meetings[10].

CPC/MDT meetings are convened by and organised by programme colposcopy services. The locations, timing and frequency of CPC/MDT meetings may vary from time to time but reasonable notice will be provided by the colposcopy service to the laboratory. While clinical teams are primarily responsible for case selection, laboratories are encouraged to submit cases for discussion. CPC/MDT meetings and cases require preparation.

Quality requirement

Protocol for CPC/MDT meetings

Participation, including a signed record of personnel attending and operational decisions, will be recorded by a person nominated by the programme. Participants must be subject to confidentiality and data protection requirements[5, 6, 10].

Laboratories are encouraged to incorporate CPC/MDT meetings into the internal continuing education of scientific staff within the laboratory.

Quality requirement

Case selection

To ensure the efficient running of CPC/MDT meetings, cases will be appropriately selected by the colposcopist responsible for the patient. Clinicians should be aware of any relevant clinical history and should have a clear understanding about the reason for CPC/MDT discussion.

7.2.15 CervicalCheck cancer review process

The CervicalCheck Cancer Review Process[13] reviews notified cases of invasive cervical cancers. It operates as a feedback and learning process within quality assurance, contributing to potential continuous improvement measures. This may lead to a request from CervicalCheck for any diagnostic material to be reviewed internally or externally.

Quality requirement

Review of histology slides

The laboratory will review slides for women with a diagnosis of invasive cancer where such is requested by the programme or treating clinician and issue the results of these reviews to the programme.

Quality requirement

Independent third-party review

Laboratories will provide all case material where requested for cases identified as warranting independent third-party review by the process for cervical cancer review.

7.2.16 Quality assurance and continuous improvement

Quality requirement

External quality assurance (EQA)

Laboratories will participate, and show adequate performance, in accredited external quality assurance (EQA) schemes for histopathology and for technical quality.

Standard 7-5

Quality metrics

A complete and accurate report containing prescribed quality metrics will be provided at regular intervals to CervicalCheck.	Complete data at least quarterly, to be received by CervicalCheck within 1 month of quarter-end.

The quality metrics collected during internal quality control procedures are used to:

- Continuously analyse performance
- Spot trends and variations
- Complete annual returns
- Cross-reference data from multiple sources
- Produce rapid analysis
- Improve performance.

The quality metrics required are detailed in the current version of the CervicalCheck 'Histo 1 Report[14]'. They include measures which should be readily available from the laboratories internal quality control processes and are based on the QA metrics specified in the Faculty of Pathology Guidelines for the Implementation of a National Quality Assurance Programme in Histopathology[1].

The quality metrics include, among others, details of:

- Workload
- Consultations
- Correlation of frozen section diagnosis with final diagnosis (if service requested)
- Cytological/histological correlation and follow-up (where available)
- Retrospective review
- CPC/MDT meetings
- External quality assurance (EQA)
- Turnaround times (TATs).

Laboratories will have the ability to separate CervicalCheck workload from other workload(s) for statistical and monitoring purposes.

The identifier assigned to an individual pathologist will be the same for different sections of the report and over successive reporting periods.

Quality requirement

Quality metrics improvement

Laboratories will undertake appropriate and timely measures to address performance issues that impact on quality metrics and resulting values outside of laboratory, national and/or international norms.

Individuals identified as poorly performing may be required to be removed from working on CervicalCheck specimens until evidence exists that their proficiency in reporting is back in line. Evidence of retraining may be sought by the NCSS.

Quality requirement

Quality assurance visits

Laboratories will accommodate on-site visits by NCSS-designated personnel for quality monitoring, audit and assurance purposes, providing access to personnel, resources, processes, documentation and results.

7.3 References

1. Faculty of Pathology, Royal College of Physicians in Ireland (July 2011). Guidelines for the implementation of a National Quality Assurance Programme in Histopathology – Version 5.0.
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4. ISO (2012) Standard 15189:2012 Medical laboratories -- Requirements for quality and competence.
5. Data Protection Act 1988. Number 25 of 1988.
6. Data Protection (Amendment) Act 2003. Number 6 of 2003.
7. EU Directive 95/46/EC - The Data Protection Directive. Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.
8. CervicalCheck Cervical Histology Form (CS/F/LAB-1 Rev 3).
9. Part 11 of the Medical Practitioners Act 2007 - Maintenance of Professional Competence.
10. CervicalCheck Guidance for CPC/MDT meetings for colposcopy services - planning successful collaboration for web-based interactive meetings between colposcopy, histopathology and cytology.
11. The Royal College of Pathologists. (2011) Standards and datasets for reporting cancers - dataset for histological reporting of cervical neoplasia (3rd edition).
12. CervicalCheck Histology SNOMED codes - SNOMED codes for histology diagnostic service – cervix (CS/PUB/LAB-3).
13. Process for the review of incident cases of cervical cancer following the introduction of a national cervical screening programme (CS/PUB/PM-10).
14. Pathology laboratories – cervical histopathology Histo1 Report (CS/F/LAB-11).

Appendix 1

Key performance indicators (KPIs)

1 Introduction

The following reflects the 'European Guidelines for Quality Assurance in Cervical Cancer Screening', Second Edition 2008 (Chapters 2 and 7)[1].

Key performance indicators (KPIs) provide an indirect evaluation of the impact of the screening programme and act by monitoring the screening process. They enable the programme to identify and respond to potential problems at an early stage. The indicators also examine aspects of the programme that in addition to influencing the impact of the programme, address the human and financial costs of screening.

Three distinct groups of indicators can be identified:

- **Screening intensity**

  The proportion of the target population actually screened within the recommended interval is the main determinant of the success of a screening programme. If the screening interval is too frequent it increases financial and human costs with only marginal gain in the reduction of incidence and mortality. The duration of the recommended screening interval must be taken account of when monitoring and evaluating screening intensity. Indicators include programme extension, compliance with invitation, coverage and smear test consumption.

- **Screening test performance**

  Indicators include the referral rates for repeat cytology and for colposcopy, in addition to the positive predictive value (PPV) of referral for colposcopy, the specificity of the screening test and the rate of detection of histologically confirmed CIN.

- **Diagnostic assessment of treatment**

  Indicators include compliance to referral and repeat cytology and for colposcopy. The treatment of high-grade lesions is also an essential performance indicator. The proportion of women who undergo hysterectomy for CIN acts as an indicator of severe over-treatment.

Coverage is the most important factor that contributes to the success of a screening programme, i.e. the proportion of women in the target population actually screened at least once during the recommended interval by the screening programme, which is three or five years depending on the age of the woman. In order to measure coverage directly, computerised registration of all cytology and the ability to link the findings of each woman individually must be in place. Tests performed outside the organised programme can be a problem in relation to the completeness of the registration. In these cases, information obtained from informal surveys can be useful. Coverage should be calculated for the entire target age group as defined by CervicalCheck and in addition stratified by the five-year age group. To obtain high screening coverage, it is essential to reach the entire target population. The aim is that all women in the target population must be invited every three or five years, i.e. about one-third or one-fifth of the target population per year.

Compliance with invitation provides a parameter of the effectiveness of sending invitations and in addition it is a measure of the perceived quality of the programme. When examining compliance with invitation, whether extensive opportunistic screening is occurring must be taken into account, as this parameter is less relevant. Organised screening programmes, as opposed to opportunistic screening have achieved a greater reduction in the incidence of cervical cancer.

Calculation of test consumption is also required in a screening programme. If there is an excess of smear tests per screened women in comparison to what the programme recommends, this is inefficient. A reliable measure of test consumption requires complete registration of smear tests, as underestimates can result from incompleteness of registration. This particularly applies with smear tests taken outside the programme. This information may be obtained from other sources.

A measure of the burden of disease from lack of coverage can be obtained by examining the incidence of invasive cervical cancer in women:

- Unscreened and underscreened
- Never screened
- Screened at intervals longer than recommended by the programme.

2. Programme extension

Programme extension should be calculated regionally and nationally. If an entire region or country is actively served by a screening programme or programmes, then the programme extension in that region or country is 100 per cent.

$$\frac{\text{N women in target population of catchment area actively served by programme}}{\text{N women in target population of entire respective region or country}}$$

2.1 Coverage of the target population by invitation

- Length of period corresponds to interval between two negative smear tests recommended by screening programme policy.
- Stratification by five-year age groups is recommended.
- For short-term monitoring, also calculate separately for women invited in the most recent calendar year in which screening was performed.
- For interpretation, take into account whether all women are invited or only a subset.

$$\frac{\text{N women invited in defined period (3 or 5 years)}}{\text{N resident women in target population}}$$

2.2 Coverage of the target population by smear tests

- Calculate separately for subgroups of women defined by:
  - o Invitational status
  - o Personally invited
  - o Not personally invited
  - o Unknown
- Programme status, i.e. smear test performed:
  - o Within organised programme
  - o Outside organised programme
  - o Unknown
- Stratification by five-year age groups is also recommended.
- Also calculate separately with eligible women as denominator.

$$\frac{\text{N women screened at least once in defined interval (3 or 5 years)}}{\text{N resident women in target population}}$$

2.3 Compliance to invitation

- Consider women invited in a given period and those among them screened.
- A cut-off date of six months after the end of the respective period is recommended for determining whether a woman was screened in response to the invitation.
- If a different cut-off procedure is used, this should be specified.

$$\frac{\text{N invited women in a given period who were screened}}{\text{N invited women in that period}}$$

2.4 Smear test activity

Include only screening smear tests (no repeat tests, e.g. after unsatisfactory smear tests or for follow-up). Count one test per 'screening episode'.

$$\frac{\textbf{A)}\ \text{N screening tests in 3 (5) years in the target population}}{\text{N women in the target population screened in the same period}}$$

B) Distribution of screened women by number of screening smears in the same period

2.5 Incidence of invasive cancer in unscreened and underscreened women in a given interval (3.5 or 5.5 years)

- Include only fully invasive cancer cases and person-years of the women not attending screening at the regular interval, i.e. women not screened in the previous 3.5 (5.5) years.
- Link screening registry and cancer registry data and calculate incidence age-adjusted, and by age group, based on the entire female population in the age groups eligible to attend screening.
- Analyse by cancer morphology (squamous vs. non-squamous)
- Calculate separately (with appropriate denominators):
  - o Women never screened.
  - o Women previously screened, but interval to last screening test >3.5 (5.5) years.
  - o Women never invited.
  - o Invited versus not invited in respective round.

$$\frac{\text{N fully invasive cancers detected in women not screened in a given interval (3.5 or 5.5 years)}}{\text{N person-years of women not screened in the same interval (3.5 or 5.5 years)}}$$

3. Screening test performance

The rate of referral for repeat cytology and colposcopy are measures of economic cost and in addition a measure of the burden on women (anxiety and time consumption). These parameters must therefore be kept as low as possible. These rates depend on the sensitivity and specificity of the screening test, the prevalence of the disease and local protocols. Because the prevalence of disease is higher in the initial screening episodes than subsequent ones, they should be calculated separately for women at the different screening episodes. The rates should also be broken down by category of the cytological abnormality that dictated the referral initially. The referral rate for unsatisfactory smear tests provides a figure that reflects the proportion of smear tests resulting from poor quality smeartaking.

The positive predictive value (PPV) of referral for colposcopy for the confirmation of histologically high grade CIN is calculated based on the actual number of women having colposcopies. This indicator shows the number of colposcopies that must be performed to find one lesion requiring treatment. This number is the reciprocal of the PPV. The overall PPV for all women referred for colposcopy is dependent on local procedures for referral and therefore should be computed by cytological category and for the various grades of CIN. As with the other referral rates, PPV is dependent on specificity and disease prevalence. Therefore it must also be calculated separately for women attending initial and subsequent screening episodes.

Because the PPV varies with prevalence of disease, test specificity should be computed. This will in addition, facilitate comparison of performance between different screening programmes. Specificity cannot be calculated directly from screening programme data, the following formula can be used for the calculation:

$$\frac{\text{Number of women with negative test results}}{\text{Number of women screened – number of women with confirmed CIN}}$$

The detection rate (DR) of CIN (especially CIN2/3), depends on the number of lesions that are present in the screened population (disease prevalence) and how many of them are actually detected (cross sectional sensitivity). Since the prevalence of disease varies geographically and is apriori unknown, it is difficult to use the DR as an indicator of sensitivity. In addition, the DR also depends on the criteria of interpretation of histology, which are subject to variation. Nevertheless, DR should be monitored and compared between European screening programmes. This will provide a tool for recognising variation in quality and for developing the descriptive epidemiology of CIN within Europe, providing information for further study to improve control of cervical cancer.

There is no easily interpretable indicator of screening sensitivity that can be collected in a screening monitoring system. It is therefore essential to link screening registry and cancer registry data. Although it is difficult to obtain comparable data, comparison of the incidence of cancers which are detected in women after having findings of normal cytology, to the expected incidence in the absence of screening provides an estimate of test sensitivity for invasive lesions. Information on cervical cancer incidence among unscreened women can be taken into account, if adjustments for selection bias in relation to screening attendance or non-attendance are calculated. Correspondingly, estimates of screening episode sensitivity may be obtained from inclusion of all screened women in the follow-up of cervical cancers. When considering programme sensitivity, women invited, but not screened, must be taken into account. Previous smear tests of women with screen-detected cancer should also be reviewed (combined with those of other women who did not develop cancer in order to avoid over-interpretation).

The distribution of the interval to reporting i.e. time between smeartaking and result communication should be monitored. Reporting delays, which are not extreme, should not influence screening effectiveness. However, such delay can affect women's perception of the quality of service, which in turn may affect participation in the programme and increases anxiety.

3.1 Distribution of screened women by the results of cytology

Calculate overall and separately for subgroups of women:

- For the regular screening interval and shorter time periods.
- Attending initial or subsequent screening.

$$\frac{\text{N screened women with cytological diagnosis}}{\text{N screened women}}$$

3.2 Referral rate for repeat cytology

Calculate separately:

- By cytology that resulted in recommendation to repeat.
- For initial and subsequent screening.

$$\frac{\text{N screened women advised to repeat test at shorter than regular interval}}{\text{N screened women}}$$

3.3 Compliance with referral for repeat cytology

Calculate separately:

- By cytology that resulted in recommendation to repeat.
- For initial and subsequent screening.

$$\frac{\text{N women screened following recommendation for repeat cytology}}{\text{N women recommended for repeat cytology}}$$

3.4 Referral rate for colposcopy

Calculate separately:

- Cytology that resulted in referral to colposcopy.
- For initial and subsequent screening.

$$\frac{\text{N screened women referred for colposcopy}}{\text{N screened women}}$$

3.5 Positive predictive value of referral for colposcopy

If the number of women, for whom colposcopy was performed is not known, estimate using number of women referred for colposcopy.

Calculate overall and separately by:

- Cytology (ASC-US+, LSIL+, HSIL+).
- Histology (CIN1+, CIN2+, CIN3+, invasive Ca).
- Initial and subsequent screening.

$$\frac{\text{N screened women who had colposcopy with histologically confirmed CIN+}}{\text{N screened women who had colposcopy}}$$

3.6 Test specificity

Calculate overall, and separately by:

- Cytology (<ASC-US, <LSIL, <HSIL).
- Histology (CIN1+, CIN2+, CIN3+, Invasive Ca).
- Initial and subsequent screening.

Test specificity cannot be computed from routine screening and follow-up data, because the true denominator is unknown. Nevertheless, either formula a) or b) on the right may be used to approximate specificity.

Normal test results refer to 'negative for intraepithelial lesions/no abnormal cells' (i.e. results not leading to referral for follow-up or confirmation).

A) $\frac{\text{N screened women not referred for colposcopy}}{\text{N screened women who had no histologically confirmed CIN+}}$

B) $\frac{\text{N screened women with normal screening test results}}{\text{N screened women who had no histologically confirmed CIN+}}$

3.7 Detection rate by histological diagnosis

Calculate separately:

- By histology (CIN1+, CIN2+, CIN3+, Invasive Ca).
- For the regular screening interval and shorter time periods.
- For initial and subsequent screening.

$$\frac{\text{N screened women with histologically confirmed CIN+}}{\text{N screened women}}$$

3.8 Cancer incidence after normal cytology

Normal cytology refers to cases recommended for re-screening at the regular interval. Count only fully invasive cancers among the women who had a normal screening cytology in the previous 3.5 (5.5) years.

Analyse by:

- Interval from index cytology.
- Cancer morphology (squamous vs. non-squamous).
- Cytology should be reviewed mixed with that of other women not developing cancer.

N screened women with fully invasive cervical cancer detected within 3.5 (5.5) years of normal cytology

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N person-years of screened women for same period after normal cytology

4. Diagnostic assessment and treatment

The success of a screening programme is reliant on diagnostic assessment being actually performed when required. Measuring compliance with referral for colposcopy requires systematic and complete registration of colposcopies. When a record is not available in the colposcopy register, the patient or her doctor should be contacted to obtain information on whether the colposcopy was performed or as a reminder for the need for examination. Compliance with colposcopy should be calculated for each category of cytology that was the initial reason for referral (more severe cytology the greater the relevance). In addition compliance should be monitored for different screening time intervals.

Another condition essential to screening effectiveness is actual delivery of requisite treatment, particularly for histologically confirmed CIN2 and CIN3.

Another important target of a screening programme is the avoidance of over-treatment. The proportion of women with pre-invasive lesions who undergo hysterectomy is a major indicator of unnecessary treatment, although some hysterectomies result from co-existing pathology. Peer review should be carried out to verify the appropriateness of treatment of such cases. It should be taken into account that relevant differences in the proportion of women with CIN who undergo hysterectomy suggest that local practice is the main cause of such differences.

The absence of SIL (or of high-risk HPV infection) can be routinely monitored at six monthly follow-up of treated women. This parameter should be included as an indicator of short-term quality of treatment.

The incidence of cervical cancer in women which was not detected by screening, although the cytology results were abnormal (i.e. after abnormal cytology), serves as a direct summary indicator of failure associated with diagnostic assessment and treatment. Various reasons for failure can be identified. For example, cervical cancer arising in women who did not comply with referral for colposcopy could represent a failure in the communication process or a lack of attendance compliance for follow-up. Cases that arise in women who had colposcopy, but without detection of CIN, represent failure in diagnostic accuracy, etc. To calculate this parameter, the screening history of each case of cervical cancer should be reviewed, and those cases should be excluded in which cancer was detected as a result of screening.

The above parameters apply under the assumption that cytology is used as the primary screening test, which is what is currently recommended. However, most of the present parameters can also be applied, with only minor changes, to different screening methods (e.g. HPV DNA testing). Depending on which screening test and screening policy that is employed, the values of some parameters (e.g. DR, PPV or specificity) may be expected to change.

4.1 Compliance with referral to colposcopy

Calculate separately by:

- Different intervals after referral (three months/six months).
- Cytology that resulted in referral.
- This measure examines the relationship between the numbers referred to colposcopy and the numbers who actually attended. It also only deals with new referrals from the programme. The denominator is the number of women referred to colposcopy from the programme (CSR) and the numerator should be the number of new patients attending colposcopy who came via the programme.

N new women attending colposcopy following referral from screening programme

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N screened women referred for colposcopy from the screening programme

4.2 Treatment of high grade intraepithelial lesions

Note: Treatment includes the following and may take place at any visit in the episode:

- Cone biopsy
- Punch biopsy/diagnostic biopsy
- Cryotherapy
- LLETZ
- Smear test
- Swabs
- Laser ablation
- Laser excision
- Radical hysterectomy
- Tracehelectomy
- SWETZ
- Cold coagulation

N women with screen-detected CIN2 or CIN3 treated

N women with screen-detected CIN2 or CIN3

4.3 Proportion (%) of women with total hysterectomy following-on screen-detected intraepithelial lesions

Calculate separately by histology (CIN1, CIN2, CIN3). Appropriateness of individual cases should be evaluated by peer review.

N screened women with histological CIN total hysterectomised

N screened women with histological CIN

4.4 Proportion (%) of women treated for CIN1

Appropriateness of individual cases should be evaluated by peer review.

Note: Treament includes the following and may take place at any visit in the episode:

- Cone biopsy
- Punch biopsy/diagnostic biopsy
- Cryotherapy
- LLETZ
- Smear test
- Swabs
- Laser ablation
- Laser excision
- Radical hysterectomy
- Trachelectomy
- SWETZ
- Cold coagulation

N women with screen-detected CIN1 treated

N screened women with screen-detected CIN1

4.5 Incidence of invasive cancer after abnormal cytology

- Include screened women:
  - o Without colposcopy carried out, despite existing indication.
  - o With colposcopy carried out, but no CIN detected.
  - o With CIN detected, but not treated.
  - o Treated.
  - o In diagnostic or post-treatment follow-up.
- Calculate overall and separately for each of above subgroups.
- Include only fully invasive cancers.
- Exclude cases detected as a result of screening.

N cases of invasive cancer in screened women after abnormal cytology

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N person-years of screened women after

4.6 Proportion of women with cytology negative for SIL, six months after treatment

N screened and treated women with negative cytology after 6 months

---

N screened and treated women followed-up for at least 6 months

Note: Treatment includes the following and may take place at any visit in the episode:

- Cone biopsy
- Punch biopsy/diagnostic biopsy
- Cryotherapy
- LLETZ
- Smear test
- Swabs
- Laser ablation
- Laser excision
- Radical hysterectomy
- Trachelectomy
- SWETZ
- Cold coagulation
- Include women treated for CIN2, CIN3, CGIN or AIS in situ followed at least six months after treatment (denominator).
- Include women negative for HR-HPV (numerator), if this test is used for follow-up.
- Follow-up protocols – at least one smear test is carried out in colposcopy six months after a treatment (colposcopy procedure). For the purposes of audit, the measure is taken at eight months.

5. Definition of performance parameters in cervical cancer screening

The specific instructions are indicated below.

For calculations for a given period of time, such as the recommended screening interval (three or five years), the dates on which the period starts and ends, and the performance for determining the target population should be recorded. For calculations based on the size of the target population, use the average over the given time period.

Note that parameters 6 (incidence of invasive cancer in unscreened women), 14 (cancer incidence after normal cytology) and 19 (incidence of invasive cancer after abnormal cytology) require linkage with cancer registry data/histological data. The follow-up periods recommended for calculation of cervical cancer incidence are six months longer than the recommended screening interval of the respective programme (3.5 or 5.5 years). The purpose of adding one half-year to the screening interval is to include screen-detected cancer at the next screening episode. Calculations based on longer follow-up periods are also recommended.

7. References

1. Arbyn M., Antilla A., Jordan J., Ronco G., Schenck U., Segan N., Wiener H.G., Herbert A., Daniel J., von Karsa L. (2008) European guidelines for quality assurance in cervical cancer screening [2nd Edition]. International Agency for Cancer Research and EU, Health & Consumer protection Directorate-General.

Appendix 2

Revision history

All chapters		
	Details	**Date**
1	Original	December 2009
2	• Restate a number of standards (those requiring 'Yes' or having to meet '100%' to reach target) as requirements. The number of standards is apparently reduced, but is actually a restatement of many standards as requirements. Update references. Former references that are no longer cited are to be transferred to a separate bibliography.	October 2013
Chapter 1 Introduction		
2	• National Cancer Registry Ireland (NCRI) statistics on cervical cancer burden in Ireland updated. • Revised background to cervical screening in Ireland, reduced historical development of standards to a note. • Re-ordered description and contents of quality assurance in (cervical) screening programmes. • Added note on CervicalCheck operation to date. • Moved goals of the programme from Chapter 2, and added objective regarding coverage. • Removed Women's Charter (now referenced). • Added narrative about the statement of the quality requirements and standards and about monitoring and measurement.	October 2013
Chapter 2 Quality assurance in programme operation		
2	• Re-order sequence of requirements and standards to better mirror a woman's engagement with the programme, from initial identification through eligibility, invitation, access and participation, and follow-up. • Standards: a) clarify description where necessary; b) specify achievable and minimum targets where appropriate.	October 2013
Chapter 3 Quality assurance in primary care		
2	• Remove guidance and best practice notes and replace with reference to 'Guide for Smeartakers' where these are covered in that publication. • Re-order to mirror a woman's pathway in primary care. • Add standards in the areas of promotion and awareness; uptake and participation (previously unscreened women); sampling, condition of sample and recording clinical details and previous treatment history; checking management recommendations accompanying cytology results; and follow-up of women.	October 2013

Chapter 4 Quality assurance in cytopathology		
2	• Remove process descriptions and replace with references where these are covered in external publications. • Restated certain requirements and standards for improved clarity. • Revised targets for certain standards based upon review and evidence.	October 2013
Chapter 5 Quality assurance in HPV testing		
2	• Chapter on HPV testing added to the Quality Assurance Standards for Cervical Screening.	October 2013
Chapter 6 Quality assurance in colposcopy		
2	• Removed descriptive sections related to organisational and clinical guidance for the operation of a colposcopy service (for separate publication). • Restatement of certain requirements and standards for greater clarity. • Revisions to certain targets based upon programme data collected and analysed. • Additional/revised requirements and standards re. diagnosis, treatment and follow-up of women (treated and untreated) to reflect use of HPV testing and new management protocols in colposcopy services. • Additional/revised requirements and standards re. data exchange with screening programme, and discharges from colposcopy.	October 2013
Chapter 7 Quality assurance in histopathology		
2	• Removed descriptive sections related to the internal operation of a histopathology laboratory. • Restated certain requirements and standards for improved clarity. • Revised targets for certain standards based upon updated knowledge and experience.	October 2013
Appendix 1 Key performance indicators		
2	• Chapter 2 in first edition, now set out as an Appendix.	October 2013

National Cancer Screening Service

The National Cancer Screening Service is part of the Health Service Executive. It encompasses BreastCheck – The National Breast Screening Programme and CervicalCheck – The National Cervical Screening Programme, BowelScreen – The National Bowel Screening Programme and Diabetic RetinaScreen – The National Diabetic Retinal Screening Programme.

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Site Visit Report March 2014

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Introduction & Conduct of Visits

The recent CervicalCheck Quality Assurance visits represent the second round of QA Site Visits, the first round having been conducted in May 2011. Since those initial visits, CervicalCheck has undertaken a retendering exercise for the provision of Cervical Cytology services and limited reflex HR-HPV testing and the refreshed contract has allowed for the repatriation of approximately half of the total workload. There are now three separate provider laboratories: two based in Ireland (Coombe Women & Infants University Hospital, Cork Street, Dublin and MedLab Pathology Ltd., Sandyford Business Park,

Dublin) and one in the US (Quest Diagnostics Incorporated, Teterboro, New Jersey).

The workload previously performed by MedLab Pathology Ltd., Austin, Texas transferred to MedLab Pathology Ltd., Ireland. While both of these organisations are subsidiaries of Sonic Healthcare Group, the laboratory based in Sandyford is an autonomous organisation with different working practices and SOPs to those used in Austin, Texas. Consequently, both the Sandyford and Coombe University Hospital laboratories have been treated as new providers for the purposes of the current visit. Only the Quest Laboratory has been treated as a 'true' second round provider.

This current round of Site Visits aims to build on the experience and data gathered in the first round. The purpose of these visits was to:

To determine, where appropriate, whether the recommendations from the previous round of QA Site Visits conducted in 2011 have been incorporated into current working practice

To assess the performance of the local screening programme against national standards and establish reasons for any variation from these standards

To support providers to improve their service where deficiencies are identified

Identify areas of good practice that might be incorporated into future quality assurance guidance

Establish whether there is good communication and co-operation between the CervicalCheck and between the various provider organisations

Provide a forum to report on the quality of the services to the Director, National Cancer Screening Service (CervicalCheck)

The visiting QA Team comprised three individuals: an independent assessor, Dr Lesley Turnbull (Consultant Cytopathologist and Lead for Cytology, Betsi Cadwaladr University Health Board; previously Quality Assurance Director, NHS North West Cervical Screening Quality Assurance); Mrs Mairead Duane, Quality Assurance Coordinator, CervicalCheck and Mrs Maeve Waldron, Laboratory Coordinator, CervicalCheck.

The date of the QA visit was confirmed some months in advance to avoid coinciding with other accreditation visits and inspections.

In preparation for the Site Visit each of the laboratories was asked to complete and return a 'CervicalCheck – QA Review, Gynaecological Cytopathology Questionnaire' and where appropriate, to provide supporting documentary evidence. In addition, with the exception of the Coombe University Hospital, the Visiting Team was also provided with copies of the CervicalCheck Cyto 1 Report 2013, Quarters 1-3. The Q4 Cyto 1 Report was subsequently provided for Quest Diagnostics. Only limited comparable data were available for the Coombe laboratory and these were provided to the Team on the day of the visit. These advance data requests provided a substantial volume of evidence to the Team and allowed a more focussed approach on the day of the actual visit.

Several days prior to the visit each of the laboratory managers was asked to extract from its archives a selection of 70 slides for examination by members of the Visiting Team (LT & MW). To minimise bias the team requested the 20 most recent consecutive cases reported from the categories of ASCUS and ASCH; and the 10 most recent consecutive cases reported as AGC, HSIL (P5) and HSIL (P6).

The Visiting Team was led either by Mrs Mairead Duane (Quest Diagnostics) or Dr Lesley Turnbull (MedLab and Coombe Hospital) who gave an outline of the proposed conduct of the visit and schedule for the day with likely timescales in respect of the subsequent report (see Appendix A). Further information/data requests were made at that time to each of the laboratories, which included requests for the following:

- **Quality Management Plan**
- **Quality Manual**
- **Five-Year Retrospective Review of HSIL+ cases - 2013 data** (to include Retrospective Review of prior negatives for current HSIL+ cases & Annual Summary for retrospective review of prior negatives) and/or Cervical Cancer audit data
- **Reportable Quality Issues (RQIs)** – Details of last 10 RQIs to include the last two cases requiring root cause analysis and/or more detailed investigation and continued surveillance
- **Staff Training Records** – training portfolios for sample of staff across spread of grades and responsibilities
- **External Quality Assurance (EQA) records**

Each of the sites was informed that a summary of the findings and proposed recommendations would be presented at the end of the visit for discussion and agreement and thereafter this would form the basis of the written report provided to the CervicalCheck Quality Assurance Committee.

Following these introductions, the visits were split between an extended inspection of the various components of case accessioning, slide preparation, screening and reporting; an examination of SOPs, the quality management plan, the quality manual and other regulatory documents; a review of

pre-selected slide material; and supplemental discussion and fact finding with medical, scientific/technical and administrative/managerial staff. Wherever possible the team sought an evidence base to substantiate verbal comments. Discussions were directed to provide an assessment of professional performance, system management and compliance with CervicalCheck quality standards, CLIA and CAP requirements. The visits were conducted in a supportive and productive

manner and aimed to enhance communication at all levels and to increase understanding of the needs of each of the parties.

Wherever possible the conduct of the visits was identical between the three sites. The only exception to this was the Quest laboratory visit, where a detailed inspection of the Cytology laboratory was not undertaken as there were no significant changes to the previous visit. Instead, the Visiting Team concentrated the site inspection on the HPV-testing facility as this was the only provider using the Hybrid Capture 2 (hc2), Rapid Capture System.

In the final session, the Visiting Team met with senior medical, scientific and managerial staff to present a summary of findings, to answer any questions and to thank the organisations for their participation and cooperation. All of the organisations were reminded that changes made subsequent to the visit could not be incorporated in the visit report. Only changes of fact or additional facts not available to the Visiting Team on the day of the visit would be admissible changes to the documentation and would usually be recorded as post scripts.

Coombe Womens & Infants Univ. Hospital

The Coombe Womens and Infants University Hospital (CWIUH), Dublin was visited on the 8th March 2014.

Site Visit findings – HR-HPV Testing

General Principles of Roche Cobas HPV DNA Test

See page 18.

Test Procedures

See page 18.

Test Considerations

HPV testing is performed in GynaeScreen, a privately funded organisation hosted by the Coombe Hospital. This laboratory is separate from the main CWIUH laboratory and has its own INAB accreditation. Samples for HR-HPV testing are identified at sample registration in Cytology and transferred to GynaeScreen once an LBC slide has been prepared. There is close liaison between these units to ensure all appropriate cases are transferred in a timely fashion.

Principles of good laboratory practice were evident during the visit. Personal protective equipment was provided to

the Visiting Team and was worn by staff members. However, neither SOPs nor other documentation in relation to GynaeScreen was provided to the Visiting Team in advance of the Site Visit.

Decapping of vials is performed manually. The caps are labelled with the test accession number to ensure accurate matching of cap and vial when the test is complete. This avoids cross-contamination if re-testing were to be needed. All test disposables are bagged, sealed and disposed of by an external provider.

The laboratory participates in the UK NEQAS Scheme for the Molecular Detection of HPV in which 4 test samples are provided for analysis on a quarterly basis.

System Maintenance, Calibration and Verification

The Biomedical Scientist who performs the HPV testing was trained and certified by Roche in the use of the Cobas x 4800 instrument and z 4800 analyser. The unit uses the standard system controls as previously described and every couple of weeks adds a recent known positive as a further internal control.

A preventive maintenance log is gathered monthly which documents daily and weekly maintenance schedules including the shutdown and restart of the system; cleaning of the deck and tip eject plate; emptying of waste; cleaning of carriers and autoload protection ribbon; and replacement of xenon lamp and fuses as required.

As an independent organisation, GynaeScreen is not linked to the Hospital LIMS and data entry and result transfers are therefore performed manually using an Excel template spreadsheet, which initially records all results as negative. Positive results are highlighted in colour and all results are double

entered to minimise any transcription errors. While result entry and authorisation are carefully controlled and quality assured it was evident that this was a time consuming process and only realistic with relatively small test numbers. Transition to a larger workload would require electronic data transfer for security.

Site Visit findings – Cytology

Sample accessioning and labelling

Cervical samples are received at the laboratory in UN3373 compliant transport boxes. The vials and test request forms are unpacked; date stamped and matched using surname, forename and date of birth. Consent for screening; test repeat interval of less than 3 months and address are also checked. Each sample is allocated 2 bar-coded labels; a laboratory accession number and a numeric only number to be scanned by the Hologic T5000 LBC system. Rejects/destroyed samples are allocated accession numbers prior to destruction to facilitate an explanatory report to the smear taker. Minor discrepancies between vials and test request forms are held till the end of the batch and resolved as soon as possible thereafter to avoid a delay in processing. Major discrepancies are returned to the responsible doctor for resolution.

The Visiting Team was informed that while screening smears are not accepted if repeated in less than 3 months, a lesser repeat interval is accepted for colposcopy derived smears. The Visiting Team recommends that this practice should cease as it increases the likelihood of a false negative result and of

discrepancy between screening and colposcopy smears. Current NHSCSP Colposcopy Management guidance advises against repeating the smear at the first colposcopy appointment.

The test request forms are passed to data entry staff who match the patient with any previous records and enter all data items on the CliniSys pathology system. This is an extremely onerous process as there are a large number of data items, often hand-written which must be checked and a number of different databases which can each hold data relevant to the patient. A full second check is performed and logged by a second clerical officer to optimise data quality.

ThinPrep™ sample processing

Once accessioned, the vials are loaded into plastic trays and each is scrutinised by a second laboratory aide who checks the name and numbers on the vial against those on the request form. Restrictions to the laboratory computer system currently prevent the logging of this second QC check.

The underside of the trays is then examined to assess blood-staining and moderate/heavily stained samples not requiring HR-HPV testing are pre-treated with glacial acetic acid. At present 5-8% of the total workload is pre-treated. Those samples are then processed on a T2000 single sample processor; the rest are processed on a T5000.

Staining is performed in a small room at the entrance to the screening room, which houses a Tissue Tek DRS 2000 stainer and Tissue Tek GLC Sakura coverslipper. Pertex is used as the mounting agent. Xylene levels are monitored regularly by an external company and are within acceptable limits. A fume extraction system is in place. Staining quality is assessed on the first run each morning and the findings are logged and initialled. Maintenance logs for each of the instruments are available for scrutiny. Slides are then scanned on the ThinPrep Imager system.

All processing and staining/coverslipping instruments have breakdown cover during week days. A preventive maintenance log is gathered daily and weekly for each system and was provided to the Visiting Team for inspection.

Cytology LBC vials are retained in a rack in the departmental preparation room for approximately 12 weeks prior to disposal. Additional vial storage is available in the external chemical store. Slides are stored on-site in a shared store room with the Histology Department and then moved to an external facility. Similar arrangements are in place for request forms.

Accommodation, Facilities and Equipment

Access to the laboratory area is via a swipe card system. The laboratory is situated in a series of rooms adjacent to a clinical area. These include a specimen reception, accessioning and processing room; a staining/coverslipping room; and a larger screening room. The multiheaded microscopy/seminar room and 2 pathologist offices are situated at the far end of a ward and staff have to gain entry to this secure area and pass mothers and newborn infants to access the training facility. The cries of infants are clearly audible from within this room. This is far from ideal from all perspectives and has both security and infection control implications. The Visiting Team does however concede that accommodation is clearly at a premium throughout the hospital with small rooms and exceedingly narrow public corridors being commonplace.

Health and safety labels are present on all pieces of equipment and service records are available for inspection. A stock rotation system is in operation and all reagents are labelled with the batch number, date of receipt and date opened.

The screening room opens from a narrow internal corridor into a light and spacious room which benefits from natural light from a row of windows along the external wall. The room is carpeted and air conditioned. Screening staff are provided with ergonomic chairs, tables, conventional light microscopes and 2 Hologic Review Scopes. All microscopes are provided with the full range of objectives required for liquid based cytology. A 5-headed microscope is available for case discussion and educational purposes. Video conferencing is available for CPC/discrepancy meetings.

Screening and reporting

Primary screening is conducted according to SOP CC-CXMREXM-P1. The Cytopathology Department changed from BSCC terminology to the Bethesda Terminology System in April 2013 and all staff are fully versed in its use. The laboratory uses ThinPrep Imager assisted-screening as an initial pre-view with a subsequent full manual screen. This replaces the more usual pattern of full manual screen followed by rapid review. Trays contain batches of 10 slides with matching test request forms. Prior to review scope screening, the screener again checks that the patient details on the slide and test request form matches those held on CliniSys and reviews any clinical history.

Medical Scientific staff flagged a problem with CliniSys which currently fails on occasion to display all available history on some patients. Work is ongoing to resolve this and a solution is expected in the near future.

The 22 Fields of View (FOVs) which have been selected by the Imager system are reviewed on a Review Scope and the screener is required to mark abnormal cells, TZ cells and infectious agents. A full manual screen is conducted if abnormal or potentially abnormal cells are noted; if the preparation is scanty and likely to be unsatisfactory; or when the slide was not scanned by Imager (identified by a red dot on the frosted end of the slide). Negative slides are then subject to a full manual screen by a different Medical Scientist and any abnormal cells identified at this stage are again marked. Any abnormal/unsatisfactory or indeterminate cases detected either on review scope screening or manual secondary screening are passed to the Chief/Senior Medical Scientist for checking when a further full screen of the slide is performed. The checker is required at that stage to report the smear as negative or unsatisfactory or to place it on the Pathologists authorisation queue for reporting. Once the case is authorised the clerical officer will match the printed reports with the test request forms and the slides on the review tray.

SOP CC-CYTOPATH-P1 describes that Cytopathologist review should take place with a Senior/Chief Medical Scientist, where possible on a multi-headed microscope. The SpR in Cytopathology must also attend the review microscope session. 2.5 minutes are allowed for each slide review with no overlap between fields. This time allocation is unlikely to be adequate for the full and proper examination of all slides and the failure to overlap consecutive sweeps of the slide means that some of the cells will not be viewed by the area of the retina which handles fine detail (macula densa) and may be missed or their full significance not appreciated. The Visiting Team requests that SOP CC-CYTOPATH-P1 is amended to remove both the time constraint and the instruction not to overlap fields.

The SOP does not include guidance on the handling of cases where the pathologist feels it appropriate to downgrade to negative a screener/checker opinion of high-grade disease. This is typically a rare occurrence, but best practice would advise that the opinion of a second pathologist is sought prior to authorising a negative result and that this consultation is documented.

The SOP does not indicate how the cytology and HR-HPV results are integrated to a single unified report although the Visiting Team was assured that this was current practice. The SOP should be expanded/amended accordingly. Similarly, following the introduction of HR-HPV testing it is no longer appropriate to mention koilocytotic atypia within the text of a report. This practice should cease with immediate effect.

The SOP does not include guidance on procedures for either medical scientists or pathologists who return to work after extended leave of more than 3 months duration.

The format of the cytology report should be revised to ensure greater clarity and emboldened text used only for the diagnostic category and management recommendations.

It was noted that random negative cases are placed on the Pathologists authorisation queue implying that pathologists report relatively few negative slides as part of their routine work. While this goes some way to addressing the problem, the Visiting Team felt that being provided with 'negative' slides is different to making that assessment personally and that the inclusion of negative cases is important in maintaining diagnostic baselines. The Visiting Team therefore recommends that potentially negative cases are included as part of pathologists routine diagnostic workload.

Reports display the identity of the cytotechnologists/medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

Key Performance Indicators

All Coombe Hospital screening staff participate in the delivery of the CervicalCheck contract. There is no stratification of workload according to individual preference or performance indicators.

Screeners are advised that they may not exceed 5 hours of combined primary screening per day. This equates with approximately 12,000 primary screens per calendar year. The pre-visit questionnaire response indicates that screener profiles are reviewed by the Chief Medical Scientist and the Pathologist on a quarterly basis but there is no available detail on the content of those reviews or of the metrics against which performance is monitored.

Senior laboratory staff were only able to provide very rudimentary performance data on the day of the visit and despite promises to provide further information subsequent to the visit, no additional data have been forthcoming. The data provided appeared to relate largely to a colposcopy-derived diagnostic workload rather than screening cases and gave little real indication as to screening performance. The Visiting Team urges that all data requests including the Cyto 1 Report are completed fully and in a timely manner.

All screening and reporting staff participate in the NHSCSP Gynaecological Cytology Proficiency Testing/EQA Scheme organised by the South West of England Regional Cervical Screening Quality

Assurance Reference Centre. Detailed SOPs are in place to monitor compliance with the testing programme and to protect the quality of the service in the event of repeated underperformance triggering agreed action points.

The Coombe laboratory also participates in the Hologic Staining Technical External Quality Assessment Scheme which assesses the quality of the Papanicolaou staining of cervical ThinPrep LBC preparations.

CervicalCheck Statistics

No current data were available for scrutiny.

5-Year Retrospective Review / Cancer Audit

SOP CC-CYTOPATH-P1 states that it is the responsibility of the Cytopathologist to review all biopsy reports and related smears where the grade of CIN in the biopsy and the grade of dyskaryosis/SIL in the previous smears are discrepant by more than one category e.g. where the biopsy shows CIN 3 and the cytology shows LSIL/CIN 1; where no CIN is seen on biopsy but there is CIN 2/HSIL or worse in the smear; and where CIN 2 or worse is seen on biopsy but the smear is negative.

While the Coombe laboratory provides both Cytology and Histology services it remains dependent on CervicalCheck to obtain histological data from patients who attend other colposcopy units. This appears to be happening but not all institutions are as yet fully compliant.

The Visiting Team recommends that the Coombe Hospital considers the introduction of individual PPVs as well as a pan-laboratory PPV. To facilitate this enhancement, individual pathologists should be registered with the CervicalCheck programme to ensure their unique ID is annotated on the result files. This would allow CervicalCheck to include this ID on the histology spreadsheets allowing calculation and monitoring of individual pathologist PPVs.

Reportable Quality Issues

A system of recording and monitoring errors and potential reportable quality issues is in place. The Visiting Team was provided with examples of recent incidents and their outcomes.

Members of the Visiting Team noted that individual sample discrepancies are routinely reported to CervicalCheck. This seems an over-enthusiastic use of the notification category, which would more typically be used for either a single major event or for a cluster of similar non-conformances which together constitute a reportable quality issue. Coombe laboratory staff are asked to restrict notifications accordingly.

Slide Evaluations

54 slides were provided for examination during the visit; 20 ASCUS, 4 ASCH, 10 HSIL P5, 10 HSIL P6 and 10 AGC. The number of ASCH cases provided was considerably less than that requested but 10 CGIN cases were provided in lieu. The latter were not examined as they were outwith the declared remit of the slide evaluation process. Each slide was subject to only brief review given the unavoidable time constraints and the findings must be viewed as indicative rather than absolute. Appendix F documents the outcomes of this review.

There was agreement with 9 of the 20 ASCUS cases; 8 were upgraded to LSIL; and 3 downgraded to negative. 2 of the 4 ASCH cases were confirmed; 2 were upgraded to HSIL (P6). There was good agreement with HSIL (P5) and near perfect agreement with cases reported as HSIL (P6).

Standard Operating Procedures and Quality Manual

The Visiting Team was provided with a range of SOPs for inspection and review. Documents are controlled via Q-Pulse and are reviewed every two years. All SOPs displayed evidence of annual review, signed distribution lists and date placed in document control but some would benefit from less general information, greater detail in respect of the procedure and the inclusions of specific metrics.

A quality manual is in place which includes the Quality Policy and describes the scope, purpose, organisation and management of the laboratory and it's Quality Management System. There is a records management program and record retention times are clearly defined.

The Visiting Team requests that documents which are put up on Q-Pulse by CervicalCheck are acknowledged in a timely manner.

Education & Training

The Cytopathology department ensures that an annual continued training plan is in place. Training includes participation in the EQA Slide Exchange Scheme, multiheaded microscopy sessions, attendance at CPCs, scientific meetings and update courses. The training plan is reviewed annually at the Quality Management System Review meeting and its effectiveness discussed. Suggested improvements are dependent on budgetary constraints and staffing levels.

Multi-headed microscopy sessions are held at least twice a month and include cases which are judged by the Chief Medical Scientist/Consultant Pathologist to be of educational interest or particularly difficult/unusual. Cases are reviewed on the multi-headed microscope and then screened individually by each staff member. Reviewed cases are signed off using SOP CC-MULTILOG-F.

Training portfolios are available for all staff grades which comprise a job description, curriculum vitae, induction and training records; and records of continued professional development (CPD) activity. All of the portfolios examined were well structured and up-to-date.

Communication

The laboratory covers 2 CPCs with the Coombe colposcopy clinic and one with the Tallaght colposcopy clinic each month. An average of 6-10 cases is discussed at each CPC. Images are usually captured digitally and imported to a PowerPoint presentation. The discussions and action points are recorded but are not formally minuted or circulated. Amended reports are occasionally issued but CervicalCheck result codes are not changed.

The Visiting Team suggests that CervicalCheck should facilitate discussions between laboratories and colposcopy units to agree a procedural mechanism to handle revised reports (i.e. where the change in diagnosis has clinical implications for the patient).

It emerged during discussion that senior Medical Scientific staff are asked by the Director of the laboratory to review and reassess smears previously reported as AGC by Quest Diagnostics,

Teterboro with a view to overturning the majority of these reports. The requests are made informally and a revised report is not issued. These women who are advised by CervicalCheck of a smear abnormality are then declined colposcopy but are asked to present for repeat smear in 12 months. However, as the result code held by CervicalCheck has not been amended they continue to receive reminder letters for colposcopy.

This is a wholly unsatisfactory situation which results in women receiving conflicting messages as to their cervical health. It places unnecessary stress on senior Medical Scientific staff who are quite rightly concerned at the lack of an audit trail and worry as to their position if even one of these women develops a confirmed glandular abnormality in due course. This has all the makings of a potential serious untoward incident.

While it is clear that Quest Diagnostics still has a significant tendency to over-report AGC, this practice would seem to be an inappropriate method of handling the problem. In the absence of data it is impossible to comment on whether the Coombe Hospital reporting standards for AGC are set too low. The Visiting Team suggests these issues would be better handled through genuine dialogue and case sharing with the aim of working towards a common unified baseline for reporting these cases.

Visit Recommendations

The Visiting Team received a warm welcome and was provided with an extensive range of additional documentation for scrutiny. All staff encountered were helpful and clearly knowledgeable and many points of good and very good practice were noted. The only outstanding request related to laboratory performance data. The inability to provide those data is clearly of concern. However, it is acknowledged that the Coombe laboratory has only recently acquired a contract for screening – derived cervical cytology.

Immediate recommendations:

- That the practice of informal requests to review and amend AGC reports ceases and that these reviews are placed on a regular footing with revised reports being issued to all parties including CervicalCheck.
- That there is dialogue between all involved parties to establish a common unified baseline for reporting AGC cases.
- That koilocytotic atypia is no longer mentioned within the text of a cytology report following the introduction of HR-HPV testing.

Short term recommendations:

- That work continues to ensure that the CervicalCheck data requirements are met fully and in a timely fashion.
- That modifications to the laboratory computer system are put in place to allow the recording of all QC checks, including those performed by clerical and screening staff.
- That work continues to modify the CliniSys pathology computer system to ensure that all items of patient history are routinely displayed to the screener.
- That GynaeScreen continues to work towards linkage with the LIMS system and moves away from manual result entry to a process of seamless electronic result handling.

- That SOP CC-CYTOPATH-P1 is amended to remove both the time taken to screen a slide and the instruction not to overlap fields.
- That SOP CC-CYTOPATH-P1 is amended to include a recommendation that the opinion of a second pathologist is sought prior to authorising as negative cases with a screener/checker opinion of high-grade disease.
- That SOPs include specific recommendations for confirming the competence of both medical and medical scientific staff who return to cervical screening/reporting after extended periods (.3 months) of absence (sick leave, maternity leave, etc.).
- That SOPs are amended to include assessing/confirming the competence of experienced screening staff who are newly appointed to posts serving the CervicalCheck contract.
- That smears taken in less than 3 months from the previous smear are deemed unsatisfactory and that no exceptions to this guidance are accepted.
- The format of the cytology report should be revised to ensure greater clarity and emboldened text used only for the diagnostic category and management recommendations.
- That documents placed on Q-Pulse by CervicalCheck are acknowledged in a timely manner.
- That the notification to CervicalCheck of non-conformances is restricted to single major events or to clusters of similar non-conformances which together constitute a reportable quality issue.
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Appendices & Tables

Appendix A - Site Visit Programme

Proposed Itinerary:

Morning Session: 09:00 – 13:00 hours

- Introduction and meet with screening leads for Ireland Workload
- Tour of laboratory to include cytopathology and molecular laboratory (HR-HPV testing)
  - Review pathway of cervical screening samples
  - Workload and competency assessment within the lab
  - Amended results process
  - CPC protocols

Afternoon Session: 14:00 – 17:30 hours

- Slide review by Cytopathologist of cases as advised prior to the visit
- Review of responses and documentation provided in pre-visit questionnaire
- Additional data requests
- Q & A session

Areas of good practice during the visit will be acknowledged and recommendations for service improvements will be made. Any areas of particular concern will be indicated in order that urgent action can be taken.

Appendix F – Coombe Hospital - rapid review of archived slides

Diagnostic category	Sub-category number	Accession number	Technical quality	Review result
ASCUS	1	C1402677	good	ASCUS
	2	C1402681	good	ASCUS
	3	C1403053	good	ASCUS
	4	C1403112	clumped ++	LSIL
	5	C1403294	good	Negative
	6	C1403344	good	LSIL
	7	C1403375	good	LSIL
	8	C1403047	good	ASCUS
	9	C1403432	good	LSIL
	10	C1403435	good	LSIL
	11	C1403577	good	ASCUS
	12	C1403586	good	Negative
	13	C1403616	good	ASCUS
	14	C1403624	good	Negative
	15	C1403698	good	LSIL
	16	C1403794	good	ASCUS
	17	C1403795	good	LSIL
	18	C1403803	good	LSIL
	19	C1403851	good	ASCUS
	20	C1403944	good	ASCUS
ASCH	1	C1402174	good	ASCH

	2	C1309208	good	ASCH
	3	C1306640	good	HSIL P5
	4	C1403717	good	HSIL P5
HSIL P5	1	C1402705	good	HSIL P5
	2	C1402883	good	HSIL P5
	3	C1403122	good	HSIL P6
	4	C1403178	good	HSIL P5
	5	C1403182	good	HSIL P6
	6	C1403196	good	HSIL P5
	7	C1403197	good	HSIL P5
	8	C1403198	good	HSIL P6
	9	C1403291	good	HSIL P5
	10	C1403298	good	ASCUS
HSIL P6	1	C1402503	good	HSIL P6
	2	C1402530	good	HSIL P6
	3	C1402755	good	HSIL P6
	4	C1403035	good	HSIL P6
	5	C1403108	good	HSIL P6
	6	C1403181	good	HSIL P6
	7	C1403346	good	HSIL P6

	8	C1403485	good	HSIL P6
	9	C1403753	good	HSIL P6
	10	C1403898	good	HSIL P6
AGC	1	C1303684	good	CGIN/HSIL
	2	C1305242	good	AGC
	3	C1307577	good	AGC
	4	C1308372	good	AGC
	5	C1311899	good	AGC
	6	C1316066	good	LSIL & ?HSIL
	7	C1401304	good	?Gland em
	8	C1403256	good	AGC fn
	9	C1402074	good	AGC
	10	C1401220	poor	AGC

Coombe Womens Hospital Quality Assurance Visit
Thursday 22 August 2013.

Attendees:
CervicalCheck Representation: Maeve Waldron (Laboratory Coordinator).
CWH Representation: Noel Bolger (Chief Medical Scientist Cytology), Mary Sweeney (senior medical scientist cytology)

1. Specimen reception:

There is a main specimen reception area where boxes are received by post and courier. These are held until collection by the cytology lab aide. Boxes are collected throughout the day and brought upstairs to the cytology lab preparation room.

2. Cytology Lab prep room:

Boxes are opened and cytology forms are stamped with the date of receipt in this area. Staff handle cases singly and check patient identifiers including name, DOB, vial number and address (where present) on both sample and vial. All forms and vials are labelled with a unique lab accession number, those with no or minor discrepancies are placed in a tray for processing on the T5 processor which is also held in this room. Any discrepancies that require either return to sender or vial destruction are held to the side- the space in the tray for this vial is left empty to allow for easy insertion of the sample when the discrepancy is resolved (or reported).
Discrepancies are handled based on the NCSS discrepancy guide and there was a copy of CS/Pub/Lab-7 visible on the desk for reference. Minor discrepancies that require a phone call are dealt with as they arise- staff have not yet encountered issues in resolving these queries in a timely fashion.
Samples that require return for correction are raised as non conformances and logged in the lab QMS. The original sample and form are returned with a non conformance sheet and a photocopy is held in a discrepancy folder (in the prep area). This folder is checked on a weekly basis to ensure that follow up calls are made if the sample has not been received back. When corrected forms are received in the lab they are date stamped again.
Where a sample is to be destroyed a cover letter is sent to the practice (as per NCSS template). In addition the sample is logged onto the LIMS and a report is issued outlining the reason for destruction. These are marked as non programme on the LIMS to ensure that notification is not sent to the NCSS.
All forms and vials are second person checked prior to sample processing and data entry.
All discrepancies are logged onto an excel sheet and can be made available to the NCSS.
Samples are processed in the same area on the T5- the system is fully automated and barcode readers ensure a robust chain of custody.

Recommendations:
-Document all discrepancies and initials on the front of the form for scanning.
-Insert text to wait 3 months before repeating smear on the report for destroyed vials.

-Currently as volume is low there is little risk of forms held for discrepancy resolution going astray, however as workload increases it may be necessary to implement additional steps to ensure that these samples are effectively managed. Ideally discrepancies should remain in the prep area- recommend a distinct area to be allocated to discrepancy resolution.
-Include a check of Dr ID and consent at this stage- if the MCRN is blank this could be resolved quickly as it is likely that the form was received with other samples from the same surgery.
-Put a notice board in place to show the date for expired samples and under 25 samples.
-Arrange access to little CSR to lab staff- this allows checking of previous consent etc.
-A scanner needs to be provided to allow access to cytology forms for the NCSS.
- for discrepancies that are returned for correction the first date stamp should be recorded as the date of receipt- I'm not sure if this is the case?

3. Data entry.

Data entry occurs in the lab office area which is located in specimen reception (downstairs from lab). There is one dedicated cytology secretary (job sharing position). The LIMS is searched for possible matches by DOB or hospital number, once a patient is selected or if it is a new patient all fields on the cytology form are entered onto the LIMS. There is only one page for data entry of all fields. When a discrepancy occurs the record is cancelled and the discrepancy separated, these may be resolved either by the secretary or escalated to the CMS.
Samples that are matched to the hospital IPMS are separated as the ppsN has to be added to the IPMS and this can delay data entry. There is a barcode scanner on the office PC to enter the lab accession number and all data entry is second person checked and may be amended. It was noted that for a recent non conformance the error was picked up on the 2nd person check but this did not overwrite the file to the NCSS.

Recommendations:

-Discrepancies should be handled at data entry where possible rather than moving forms to the CMS- (Dr ID discrepancies in particular could be handled by data entry staff).
-Any amends to forms to be documented and initialled by lab staff.
-An IT change to be implemented to allow corrected data to overwrite data held in the NCSS notification file prior to sending to the NCSS.
-Cover to be in place for when the cytology secretary is on leave to prevent a backlog at data entry.
-All PCs that are used for data entry (lab and office) to be fitted with barcode scanners to prevent typographical errors when entering the lab accession numbers.

4. Screening and reporting:

The screener has access to NCSS history when screening the slide, this is imported directly into the LIMS and is displayed. The primary screener enters the result code and the secondary screener enters both their result code and the management

recommendation code. Each report prints as it is authorised, is matched up with its request form and the details are checked before final release.

NHS
Cancer Screening Programmes

North West Cervical Screening Quality Assurance

Dr Lesley S Turnbull

NCSS Visit to US Provider Laboratories

NORTH WEST CERVICAL SCREENING QUALITY ASSURANCE REFERENCE CENTRE

Site Visit Report May 2011

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Introduction & Conduct of Visits

Multidisciplinary QA site visits are an important and extremely useful element of the quality assurance repertoire and have been a usual component in the assessment of quality assurance in English cervical screening laboratories for over 10 years. While the National Cancer Screening Service (NCSS) currently gathers an array of workload and performance data relating to the two current cytology providers, the addition of site visits is likely to provide new information and a different perspective on the functioning of these services.

The purpose of these visits was to:

- Assess the performance of the local screening programme against national standards and establish reasons for any variation from these standards
- To support providers to improve their service where deficiencies are identified
- Identify areas of good practice that might be incorporated into future quality assurance guidance
- Establish whether there is good communication and co-operation between the NCSS and the provider
- Provide a forum on which to report the quality of the services provided to the Director, National Cancer Screening Service (NCSS)

The visiting QA Team comprised three individuals: an independent assessor, Dr Lesley Turnbull (Consultant Cytopathologist and Director, North West Cervical Screening Quality Assurance Reference Centre) together with Mr Patrick Cafferty, Planning & Risk Manager, NCSS and Mrs Maeve Waldron, Laboratory Coordinator, CervicalCheck.

The date of the QA visit was confirmed some months in advance to avoid coinciding with other accreditation visits and inspections. On the day prior to the visit each of the laboratory managers was asked to extract from its archives a selection of 70 slides for examination by members of the visiting team (LT & MW). To minimise bias the team requested the 20 most recent consecutive cases reported from the categories of ASCUS and ASCH; and the 10 most recent consecutive cases reported as AGUS, HSIL (P5) and HSIL (P6).

The Visiting Team was led by Pat Cafferty who gave an outline of the schedule for the day and likely timescales in respect of the subsequent report (see Appendix A). It was made clear that a verbal report would not be provided on the day of the visit. This was followed by a brief presentation on the history and guiding principles of CervicalCheck from Maeve Waldron. Thereafter the day was split between an extended inspection of the various components of case accessioning, slide preparation, screening and reporting; an examination of SOPs, the quality manual and other regulatory documents; a review of pre-selected slide material; and supplemental discussion and fact finding with medical, scientific/technical and administrative/managerial staff. Wherever possible the team requested an evidence base to substantiate verbal comments. These sessions were directed to provide an assessment of professional performance, system management and compliance with NCSS quality standards, GLP and CAP requirements. The visits were conducted in a supportive rather than inspectorial manner and have hopefully provided a route by which communication can be expanded and acknowledged problems discussed in an open and fruitful medium.

In the final session, the Visiting Team met with senior medical and scientific staff to answer any questions and to thank the organisations for their participation and cooperation. Both commercial organisations were reminded that changes made subsequent to the visit could not be incorporated in the visit report. Only changes of fact or additional facts not available to the Visiting Team on the day of the visit would be admissible changes to the documentation and would usually be recorded as post scripts.

Clinical Pathology Laboratories

The facility based at Austin, Texas was visited on the 10th May 2011.

Sample accessioning and labelling

Samples which are to be dispatched to CPL, Austin are sent initially to the collection point at MedLab where cases are accessioned and labels are applied to both the vials and request forms. The slide labels are packaged with the vials and request forms in cardboard transport boxes which are UN3373 marked and compliant. Each box contains 60 samples. The Visiting Team noted that the rolls of labels it witnessed being unpackaged had stuck together and when unravelled, some labels adhered to other parts of the backing tape changing their order in the numeric sequence. Processing staff had to move labels to ensure they were in the correct order.

The label includes a unique bar code and sample accession number only. No other patient identifiers are present on the printed label. Specifically, neither the patient name nor date of birth is included.

Fundamental to all aspects of cellular pathology is the concept of a 'chain of custody'. This ensures that the slide examined by the cytotechnologist/pathologist is representative of the original sample, and that the right result is therefore allocated to the right patient.

Samples are accessioned in batches of 60 cases. 60 slides are laid out in 5 x 12 grid. The request forms are in order from 1-60. The patient names are hand written on the glass slide in sequence. The printed labels are then peeled off the adhesive strip in groups of 3 and applied to the slides. The slides are then placed in the cardboard box containing the 60 vials, sequentially in order A1-5, B1-5….L1-5. At no time is there a comparative check of all details on the vial, request form and slide. The process is dependent on the vials, slides and labels being in the correct order. There is the potential therefore for the chain of custody to be broken and this is a risk to the integrity of the screening programme.

Accommodation, Facilities and Equipment

The laboratory is situated in modern purpose-built accommodation. The cytology service is delivered from a number of separate rooms each dedicated to a specific purpose. These include a specimen reception and processing laboratory; two screening rooms and individual pathologist offices.

The spacious preparation room accommodates the processing of ThinPrep ™ and SurePath™ samples, staining machines, Thin Prep™ Imager and FocalPoint™ Slide Profiler systems and non-gyn sample preparation. Each of these activities occupies separate zones of a single laboratory. ThinPrep™ samples are processed using two separate banks, each of six T2000 machines. Each of these has a linear stainer/coverslipper situated alongside with an integrated exhaust system to evacuate xylene fumes. A single operator controls a bank of six T2000 machines and processes samples for a maximum of 2 hours without breaks. On average a batch of 600 ThinPrep samples takes 5 hours to process.

Both screening rooms are divided by intermediate height partitions into individual booths optimising screening conditions. The rooms are spacious, light, air-conditioned and fully carpeted. The screening and reporting staff are provided with ergonomic chairs, tables and microscopes. All microscopes are provided with the full range of objectives required for liquid based cytology. Neither double-headed nor multi-headed microscopes are available for routine use by cytotechnologists. Double-headed microscopes and camera facilities are available in individual pathologist offices and video conferencing is available for MDT/discrepancy meetings. The relative lack of double- and multi-headed microscopes severely curtails feedback to screening and checking staff and prevents group discussion of cases for quality control or educational purposes. This represents a risk to the screening programme.

ThinPrep™ sample processing

The ThinPrep™ T3000 is an automated multi-sample processor which has an internal labelling system. This reads the barcode on the vial and prints the patient name and slide number on the slide. No human intervention is thus required. In contrast, the T2000 is a single sample processor which requires manual pre-labelling of slides.

The samples are processed in batches of six. This numeric does not match the grid pattern of the transport boxes (rows of 5 vials) requiring the operator to move between rows to provide samples to each of the T2000 machines. The boxes, each containing 60 vials and 60 slides, are provided to the operator who takes two vials and two slides at a time and places them in front of two of the T2000 machines. This is repeated for the remaining four machines. Once all six samples and slides are distributed, the vials are opened in sequence, the vial and labelled slide are offered to the machine and the processing sequence is commenced. The operator then sequentially places new filters in front of each machine. When the processing sequence is complete the slides are removed from the machine and placed in a jar of xylene. The filter is then also removed and discarded and the machine wiped with a tissue to avoid cross-contamination with the next sample prior to a fresh filter being inserted.

The operator who was witnessed by the Visiting Team performed the tasks at considerable speed and showed exceptional manual dexterity. While not wishing to detract from the considerable skills of this individual, it was apparent that the operator focussed primarily on the speed of execution. There was no apparent checking to ensure that vial and slide matched. This would have required at least some of the vials to be rotated to read the label and this was not evident to either of the Team members who observed a number of processing cycles. There was also a risk that the opened vial which is placed in front of the T2000 could be spilled and therefore lost.

Slides are stained and coverslipped on a Sakura™ Tissue-Tek Prima. A servicing record was available for scrutiny. Daily quality control checks by senior technical staff monitor and record the quality of staining. The record does not include the batch number of the stain. The quality of the preparation is assessed by individual primary screeners at the time of screening; there is no separate assessment of overall slide quality prior to this. Approximately 1% of samples are reprocessed using glacial acetic acid, usual reasons for reprocessing include a sample which is heavily blood stained or of low cellularity.

Screening and reporting

Primary screening is conducted according to agreed SOPs and a full double screen is undertaken on all NCSS slides. Reporting follows the NCSS national standard classification system. NCSS P&R codes are added by MedLab staff using the NCSS Cytology Terminology Translation Table. Reports display the identity of the cytotechnologists/medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

For all negative NCSS cases, the report is authorised by the second cytotechnologist who has screened the slide. The bar codes on the slide and request form are scanned to ensure both relate to the same woman. The cytotechnologist then checks the woman's details, cytological report and clinical management recommendations prior to authorising the report. There is therefore no independent check of the accuracy of the result and management recommendations prior to authorisation.

Key Performance Indicators

All CPL screening staff participate in the delivery of the NCSS contract. There is no stratification of workload according to individual preference or performance indicators. CPL was unable to segregate NCSS work from other clinical workloads and it was clear that screeners typically undertook work from a range of different clients during any single working day. It was therefore unable to provide assurance that screening staff were compliant with NCSS 'Quality Assurance in Cytopathology' para 5.2.2.3, workload requirements (primary screening). In particular, that primary screening does not exceed 6 hours primary screening per day with a maximum of 60-80 LBC samples in any 24 hour period.

Cytotechnologist Screening Productivity data were provided to the Visiting Team for October, November and December 2010. These tables document activity levels for individual screeners for a range of different activities, and include numbers of cases and slides. Most of the screeners have productivity levels which appear to exceed NCSS recommendations.

Screener performance is monitored through 10% quality control where accuracy rates of 95% or lower or 3 SIL discrepancies in a 3 month require remedial action. This is supplemented by the monitoring of abnormal rates, retrospective review, cytologic/histologic correlation, the tracking of major diagnostic discrepancies and CAP survey testing. Locator and diagnostic skills are monitored separately with corrective action plans relating to 1st, 2nd, 3rd or 4th occurrence.

Major diagnostic discrepancies (MDD) are defined as a difference of 2 or more grades between the opinions of the cytotechnologist and pathologist. These are initially separated into over-calls and under-calls and reviewed by the technical supervisor and Medical Director who assess whether the difference relates to locator or diagnostic skills. Feedback is provided to the individual cytotechnologist. If the number of MDDs exceeds the departmental average or if a pathologist voices concern then corrective action is implemented. This includes case review at a double-headed microscope; review of study sets; review of all abnormal cases by a supervisory cytotechnologist before pathologist sign out; or a reduction in screener workload. It is of note that in discussion CPL staff said they did not routinely have training slide sets available for review.

The Lead Cytopathologist is provided with a monthly Technical Summary Report for all screening staff. This details the % reactive and ASCUS rates, ASCUS/SIL ration, % of slides subject to QC and Accuracy Percentage. This determines the workload limit and minimum % of cases for QC in the following month and whether corrective action or retraining is required. This is signed off by the medical and technical leads.

All screening and reporting staff participate in Proficiency Testing with action points triggered on 2 consecutive failures. Only one individual had failed proficiency testing in the recent past.

The NCSS data are not currently used as standalone performance indicators.

NCSS Statistics

Appendix D gives a breakdown of the reporting profile for NCSS cases reported by CPL in the 4th quarter 2010 covering a total of 41,130 samples from a range of sources.

Population-based screening is in its relative infancy in Ireland although opportunistic screening has been widely available for some considerable time. There will therefore be a mixture of both prevalent and incident disease within the population and expected abnormality rates are difficult to predict with any certainty. There are, however, some values which give cause for concern and which impact on other elements of the programme, particularly colposcopy.

The inadequate rate of 1.10% is within the expected range for slides reported using Bethesda adequacy criteria.

The ASCUS P3a value of 8.21% lies between the 75th-90th percentile for CAP. The achievable standard in England for the combined diagnostic categories of Borderline/Mild (Bethesda categories ASCUS/LSIL) is between 4.0-7.5% (10th-90th percentile range). The comparable figure of 12.07% substantially exceeds the upper limit of that range.

A total of 1.98% of cases was reported as HSIL (P5 & P6) or possible high-grade (ASCH). The ASCH value again lies between the between the 75th-90th percentile for CAP with the HSIL value between the 90-95th percentiles.

The histological outcomes are unknown for many of these cases and it is not therefore possible to ascertain 'true disease' rates by calculating PPVs (positive predictive values). This information is clearly required as it will provide valuable feedback to laboratories and can be used to both monitor and influence reporting practices.

Slide Evaluations

71 slides were examined during the visit; 19 ASCUS, 20 ASCH, 10 HSIL P5, 10 HSIL P6 and 12 AGUS. Each slide was subject to only brief review given the unavoidable time constraints and the findings must be viewed as indicative rather than absolute. Table 1 documents the outcomes of this review.

There is an apparent trend to over-report cases as ASCUS; to both over- and under-report ASCH cases; and to report cases as AGUS when a high-grade squamous lesion or other differentiation is more likely. This pattern of reporting is not unexpected and is safe, conservative and protective to the parent organisation. Unfortunately, it is likely to result in unnecessary repeat smears and referrals to colposcopy and places a significant additional financial burden on the programme.

Standard Operating Procedures and Quality Manual

The Visiting Team was shown a range of SOPs most of which were acceptable, although some were of a relatively low standard. There was inconsistent evidence of annual review of SOPs or that the date of review had been placed in document control. Distribution lists of SOPs were often absent.

The Quality Manual was at best rudimentary and contained little meaningful information. Some of its expected components were identified within other documents, but were therefore difficult to consistently and reliably identify.

Certificates of accreditation with both The College of American Pathologists and Clinical Laboratory Improvement Amendments (CLIA) were provided for scrutiny.

Education & Training

All cytotechnologists are expected to undertake 2 CME credit hours in Cytology Continuing Education per month. Suitable educational opportunities include ASCP teleconferences, the Interlaboratory Comparison Program, textbook or journal article review presentations and interesting case reviews. Individual cytotechnologists are required to verify attendance at educational sessions by signing attendance sheets. The documentation is provided to CAP for accreditation purposes.

A documented process is in place for the orientation and induction of newly appointed cytotechnologists. The precise number of cases which are fully rescreened during this period depends on the number of years of recent experience in cervical cytology and the accuracy rate achieved during the rescreen period.

Communication

CPL participates in a monthly slide review meeting with designated members of NCSS, colposcopists and MedLab Pathology. NCSS provides a list of cases for review and selected slides are then scanned using Aperio Scan Scope for demonstration during the video conference.

Visit Recommendations

The Visiting Team noted many point of good practice but has also identified a number of areas which require either immediate or early correction. These are as follows:

Immediate recommendations:

- The provider must amend handling procedures to ensure a robust 'chain of custody' across the specimen pathway. Specifically, this must include specimen accessioning, slide preparation and labelling, screening, checking and reporting and must involve the cross-checking of a minimum of 3 and preferably 4 patient identifiers at each stage. Mandatory identifiers would include surname, first initial of forename and slide number; other identifiers would include full forename and NCSS number. The chain of custody cannot be reliant on the correct positioning of vials or slides. Revised SOPs must be provided to NCSS documenting this change to current practice.
- The speed of sample processing witnessed by the Visiting Team is of concern and represents a risk to the programme. The provider must ensure that processing staff are allocated sufficient time to ensure accurate checking between the vial and slide, prior to the sample being processed.
- Slide labels must include patient surname and forename or first initial of forename in addition to the bar code and accession number.
- An independent check of the case result and management code should be implemented, preferably by a senior cytotechnologist, prior to report authorisation to minimise the risk of error.

Short term recommendations:

- MDTs must be minuted to record those in attendance and to document discussion and any change in diagnosis and/or management. Changes to either cytological or histological reports must be recorded on the laboratory IT system and the amended report forwarded

to NCSS. As part of an on-going educational exercise, the reporting pathologist must be advised of diagnostic changes if he/she is not in attendance during the MDT.

- All specialities in cervical screening (cytology, histology and colposcopy) involve subjective decisions, which with the benefit of additional information, hindsight, etc. may need to be altered. A culture must always be encouraged which allows clinical impressions and pathological diagnoses to be changed without apportioning blame. Ultimately this ensures the best service to the patient and reduces the likelihood of either over- or under-treatment. Laboratories which participate in population–based screening programmes should work closely with colposcopy units to monitor correlation between the investigative arms of the programme and jointly agree further management where discrepancies are unresolved.
- It must be recognised that population-based screening programmes have different data requirements to services which deal predominantly with individual gynaecologists and general practitioners. CPL should work with the NCSS to agree a suite of key performance indicators which allow accurate monitoring of the programme and minimise risk to women who participate in that programme.
- The Quality Manual is at best rudimentary and provides little evidence that a formal system of document control is in place. The quality manual and quality management systems should be expanded and enhanced to ensure they provide all appropriate information.
- In-house case discussion and feedback/training appears very limited and is hampered by the absence of multi-headed discussion microscopes. The acquisition of a multi-headed microscope is strongly recommended.

The Visiting Team was aware that little information was available which was specific to the NCSS workload and it was therefore difficult to accurately assess the performance of the service or whether all aspects of the service were compliant with contractual obligations. Performance indicators focused primarily on the individual and many of the metrics include only a small percentage of the total cases examined by any one individual.

It is likely that additional data items will be required to allow a more accurate evaluation of the CervicalCheck programme. The author urges the company to work collaboratively with the NCSS to achieve this aim.

Appendices & Tables

Appendix A - Site Visit Programme

09.30	Meet with Lab Manager /QA Manager / Lead Pathologist / Operations Manager as appropriate
09.45	Overview of CervicalCheck Programme to include its goals and objectives
10.00 – 11.30	Verification of laboratory processes and procedures based on College of American Pathologists, Cytopathology Accreditation Checklist and good laboratory practice. The sample pathway will be scrutinised from reception and data entry, through processing, screening and reporting to authorisation and queuing reports for printing
11.30	Review of Standard Operating Procedures, Audit records, CPC attendance and non-conformance procedures
LUNCH	

14.00 – 16.00	Slide review session – Dr Turnbull and Mrs Maeve Waldron	Review of Quality Management System – Pat Cafferty
16.00 – 16.45	Supplementary time for additional data requests	
16.45 – 1800	Question and answer session	

Appendix B – CPL Screening data – Q4 2010

	Pattern Code												
Source of Specimen	**P1 Inadequate / Unsatisfactory**	**P2 NAD**	**P3a ASCUS**	**P3b ASCH**	**P4 LSIL**	**P5 HSIL**	**P6 HSIL**	**P7 ?Squamous Cell Ca**	**P8a AGC**	**P8b AGC Favour Neoplastic**	**P9 ?Glandular Neoplasia**	**P10 Broken or Damaged Vial**	**Total**
GP	430	32522	2816	179	936	167	229	2	31	26	5	71	37414
***Primary Health Clinic**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
GUM/STD		15	5	1	2	1	1						25
Gynae Clinics	10	247	25	2	8	1	3			2		4	302
Colposcopy	13	2210	532	74	386	51	108		9	4	2		3389
	453	34994	3378	256	1332	220	341	2	40	32	7	75	41130
Percentages	1.10%	85.08%	8.21%	0.62%	3.24%	0.53%	0.83%	0.00%	0.10%	0.08%	0.02%	0.18%	100.00%

Numbers and percentages of cases by source of sample and diagnostic category

Table 1 - CPL rapid review of archived slides

Diagnostic category	Sub-category number	Accession number	Technical quality	Review result
ASCUS	1	ZB119779	good	Negative
	2	ZB119901	good	ASCUS
	3	ZB120018	good	ASCUS
	4	ZB120546	good	Negative
	5	ZB120582	good	ASCUS
	6	ZB120690	good	LSIL
	7	ZB120724	acceptable	Negative
	8	ZB121122	good	ASCUS
	9	ZB121276	good	Negative
	10	ZB121310	poor	ASCUS
	11	ZB121365	good	Negative
	12	ZB121392	good	Negative
	13	ZB121445	good	Negative
	14	ZB121463	good	Negative
	15	ZB121507	poor	Negative
	16	ZB121543	good	ASCUS
	17	ZB121614	good	Negative
	18	ZB121632	good	Negative
	19	ZB121721	good	Negative
ASCH	1	ZB103090	good	ASCH
	2	ZB103106	good	ASCH
	3	ZB103161	good	HSIL P6
	4	ZB103714	acceptable	LSIL
	5	ZB105933	good	ASCH
	6	ZB107661	good	ASCH
	7	ZB108265	good	ASCH
	8	ZB108819	good	HSIL P5
	9	ZB110933	good	Negative
	10	ZB111823	good	ASCH
	11	ZB112007	good	Negative
	12	ZB113078	good	Negative
	13	ZB114306	good	ASCH
	14	ZB114567	good	Negative
	15	ZB115822	good	HSIL P6
	16	ZB118593	good	Negative
	17	ZB118726	good	Negative
	18	ZB119394	good	ASCH
	19	ZB119948	good	ASCH
	20	ZB119957	good	HSIL P6
HSIL P5	1	ZB102790	good	LSIL
	2	ZB103026	good	HSIL P5
	3	ZB103053	good	HSIL P6
	4	ZB103133	good	HSIL P6

	5	ZB110746	good	HSIL P5
	6	ZB112722	good	HSIL P6
	7	ZB114100	good	LSIL
	8	ZB116178	good	HSIL P5
	9	ZB116347	good	HSIL P5
	10	ZB120484	good	HSIL P5
HSIL P6	1	ZB108621	good	HSIL P6
	2	ZB111968	good	HSIL P6
	3	ZB113560	good	HSIL P6
	4	ZB114020	good	HSIL P6
	5	ZB114351	good	HSIL P6
	6	ZB115617	good	HSIL P6
	7	ZB117710	good	HSIL P6
	8	ZB118691	good	HSIL P6
	9	ZB118708	good	HSIL P6
	10	ZB119385	good	HSIL P6
AGUS	1	ZB085939	acceptable	Unsat
	2	ZB089197	good	AGUS
	3	ZB089203	good	? Glandular
	4	ZB096404	good	Negative
	5	ZB100221	good	HSIL P5
	6	ZB102771	good	HSIL P6
	7	ZB103151	good	HSIL P6
	8	ZB105871	poor	HSIL P5
	9	ZB112151	good	HSIL P5
	10	ZB113318	poor	Unsat
	11	ZB063252	good	? Glandular

Medlab Pathology Ltd., Quality Assurance Visit Wednesday 07 March 2012.

Attendees:
CervicalCheck Representation: Maeve Waldron (Laboratory Coordinator), Mairead Duane (QA Coordinator)
Medlab Representation: Denise Doyle (Quality Assurance Manager), Lisa Clare (Quality Assurance Associate), Sabrina Carter (Cytology Manager), Vivienne De Villiers (senior medical scientist cytology)

1. Specimen holding area:

On entering the area a holding rack was observed containing unopened boxes and numerous trays of 25 vials with forms. These were unlabelled but the trays were labelled numerically and the corresponding forms were on top of the trays (with a cover sheet containing the tray batch number). The earliest date for those not data entered was 2nd March- cytology staff verified that there was a backlog at present at specimen reception and data entry areas.

Risk: Boxes that had already been opened were not proceeding to data entry in a timely fashion, therefore there is a risk of expiry, also movement of forms and vials from Specimen reception area (SRA) back to specimen holding area then onwards to data entry. In addition the tray batch number was repeated hence if the forms with the cover sheet became separated from the vials it may be difficult to trace them back.

Recommendation: Medlab to review operations and determine what are the rate limiting steps in the process that is allowing a backlog to build up.

2. Specimen reception area:

Boxes are opened and stamped with the date of receipt in this area and it is dedicated to cytological specimens. Staff handle cases singly and required fields are ticked by the reception area staff. If all of these data items match then the vial is placed in a numbered tray and the back of the form is initialled with the clerks initial. Once complete with 25 vials and forms they are sent back to the specimen holding area with their forms, to await data entry (think so ? are they then assigned the batch number at this stage)?? There was a notice board containing the date for expired samples (set at 5 weeks) and under 25 samples in view for staff to check.
Any discrepancies picked up at this stage are separated into a queries tray. When a tray of 25 queries is full it is placed on a holding rack for discrepancy staff to handle. Discrepancies include expired vials/samples, under 25's, blank forms/vials, form- vial mismatch, Dr ID discrepancies, no consent.

Risk: All queries/ initials are recorded on the back of the request forms- this means that they are not available for audit once the forms are scanned.
All queries are placed together in the one tray to be handled and triaged at a later stage- Samples are not accessioned at this stage, there is a lot of movement of samples and forms prior to accessioning increasing likelihood of mismatches as the forms can

easily become separated from the vials. No access to little CSR to remedy errors at this stage.

Recommendation: That Medlab would document all queries/initials at the front of the form for scanning. That Medlab would consider triaging certain issues at this stage for quick turnaround. Expired vials/Samples and blank forms/vials are not queries and should be processed separately (either returned or resulted) in a timely fashion. In the absence of accessioning the vial/form which are redirected for discrepancy resolution at this stage that medlab would look into some method of linking the two. In addition it came to light that staff ring the GP when they notice an expired vial. CervicalCheck do not require this as it is a waste of resources. Preference would be to fastrack the expired vial, result it and separate from Discrepancies.

3. Data entry (quick entry) area.

Initial data entry occurs in this area. The Dr ID and the first initial of the surname is entered and this generates the barcode labels for the form and sample, the sample type (cervix or vault is also ordered at this point). Staff check vials and forms match and required fields are completed. Once accessioned the forms are separated from the vials, forms to full data entry and vials to slide preparation (Dublin) or dispatch (CPL). Any discrepancies are pulled and send to the discrepancy area. Barcodes do not contain identifiers other than accession number?? (I think so)

Risk: this is the first time that a number is applied to the form and vial linking them together, also it appears inefficient to have two separate data entry areas.

Recommendation: Data quick entry ideally should be performed in the same area as box opening to minimise the movement of vials and forms prior to accessioning. Lab management alluded to the possibility of merging quick entry and full data entry and this would facilitate a more streamlined efficient process.

4. Discrepancy handling:

This is an area beside the quick entry area where discrepancies are triaged. The staff take a tray of 25 queries from SRA and bring them to discrepancies. The samples are assessed and some queries may be resolved at this stage. However for the majority of samples the forms are separated from the vials and sent to the customers' services department which is located in an office upstairs. Any calls made are logged onto a customer relations management (CRM) system and open issues are reviewed on a daily basis. As queries are resolved they are passed back to SRA for start over and restamping ?? Do they need to remain in batches of 25?? It was unclear at the visit as to the volume of queries that are resolved without requiring escalation to customer services.

Risk: The majority of samples are not accessioned at this stage yet they are moved to an upstairs office. High risk of losing forms/ mismatch. In addition once the forms are returned from the customer services department there is no unique number (on the form) to link with a CRD number, hence it must be difficult to trace calls or interventation that are made to resolve the discrepancies.

Difficult to ascertain how those samples that do not require a telephone call are logged, or flagged as aging. Expired vials and samples mixed in yet these are not true discrepancies.
When the discrepancy is resolved a second date stamp is applied at sample reception- which is not the true date of receipt
Blank vials which are automatic rejection are in the tray with other vials- possibility of mix up if > 2 blank vials (although form is wrapped around vial)- adding in unnecessary delays to processing.
According to SOP minor discrepancies can be forwarded to CPL with only quick data entry completed.
According to SOP consent can be assumed if patient has had a smear since 2000- why??

Recommendation: As outlined in previous section, recommend a process of linking the forms to the vials whilst being processed prior to discrepancy resolution . Also put a system in place to link a unique number (on the form) to link with a CRD number, to improve traceability to calls or interventions that are made to resolve the discrepancies. Recommend a 'countdown' alert from 10 days on the CRD system to flag issues that are > 5 days 'open'. At the moment it is not transparent as to how long an issue is open.

5. Full Data Entry

Forms with a cover sheet labelled with the tray number are placed in numbered pigeon holes outside data entry and are taken in order by DE staff.
Patient can be searched using DOB, PPSN or CSPID number and a list of possible matches appears. This list gives name, DOB and first line of address. The DE clerk can select one from the list or enter as a new patient. If one from the list is chosen and details are similar but not exact it is sent to a "superuser" to decide if a match should be made. There are 3 screens for complete data entry; of note not all clinical details are recorded as given. The first two screens are rechecked by the user prior to saving the record. Any discrepancies picked up at full data entry are placed in a dedicated tray and the batch is held until either the discrepancy is resolved or else a later form is in filled to complete the batch. The record is saved prior to the third screen which enters smear taker details and consent. It was not clear whether the record was wiped from the system if the consent was set to N. Users must exit a record if they discover a discrepancy.

Risk: If there are 2 date stamps the more recent stamp is recorded as the date received but this is not the true date.
Data entry room is located some distance from sample reception area.
Discrepancies are sent upstairs to customer services for resolution.

Summary of Recommendations:

Rearrange the work flow/ layout to minimise delay between box opening and sample accessioning (lean technology). Medlab to review operations and determine what are the rate limiting steps in the process that is allowing a backlog to build up.
Separate true discrepancies that require an action prior to accessioning to those that may be accessioned without delay.
Record any interventions on the front of the form to ensure visibility when scanned.
Record possible GP on form if form received without DR ID number.
If no DR ID recorded but form is stamped, and this GP is registered as a CRD with CervicalCheck this may be recorded as MCRN - no telephone call required.
Do not telephone GPs for expired samples and vials
Amalgamate quick and full data entry.
Discrepancy handling requires review- samples and vials should not be separated to different areas in the lab prior to accessioning. Ideally no sample should leave specimen reception with a query outstanding.
Resolved queries should be accessioned once resolved- why are they returned to SRA.
Implement alerts or countdowns on CRM for aging samples with outstanding queries.
Implement failsafe and tracking process for those not recorded on CRM with outstanding queries- eg. No form received, no DR ID recorded at all on form.
Request access to little CSR for staff handling queries
Data entry should record date received in lab, not date that query is resolved.
Barcodes to include at least 3 identifiers- accession number , surname, 1st initial forename at minimum.

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Site Visit Report March 2014

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Introduction & Conduct of Visits

The recent CervicalCheck Quality Assurance visits represent the second round of QA Site Visits, the first round having been conducted in May 2011. Since those initial visits, CervicalCheck has undertaken a retendering exercise for the provision of Cervical Cytology services and limited reflex HR-HPV testing and the refreshed contract has allowed for the repatriation of approximately half of the total workload. There are now three separate provider laboratories: two based in Ireland (Coombe Women & Infants University Hospital, Cork Street, Dublin and MedLab Pathology Ltd., Sandyford Business Park, Dublin) and one in the US (Quest Diagnostics Incorporated, Teterboro, New Jersey).

The workload previously performed by MedLab Pathology Ltd., Austin, Texas transferred to MedLab Pathology Ltd., Ireland. While both of these organisations are subsidiaries of Sonic Healthcare Group, the laboratory based in Sandyford is an autonomous organisation with different working practices and SOPs to those used in Austin, Texas. Consequently, both the Sandyford and Coombe University Hospital laboratories have been treated as new providers for the purposes of the current visit. Only the Quest Laboratory has been treated as a 'true' second round provider.

This current round of Site Visits aims to build on the experience and data gathered in the first round. The purpose of these visits was to:

- To determine, where appropriate, whether the recommendations from the previous round of QA Site Visits conducted in 2011 have been incorporated into current working practice
- To assess the performance of the local screening programme against national standards and establish reasons for any variation from these standards
- To support providers to improve their service where deficiencies are identified
- Identify areas of good practice that might be incorporated into future quality assurance guidance
- Establish whether there is good communication and co-operation between the CervicalCheck and between the various provider organisations
- Provide a forum to report on the quality of the services to the Director, National Cancer Screening Service (CervicalCheck)

The visiting QA Team comprised three individuals: an independent assessor, Dr Lesley Turnbull (Consultant Cytopathologist and Lead for Cytology, Betsi Cadwaladr University Health Board; previously Quality Assurance Director, NHS North West Cervical Screening Quality Assurance); Mrs Mairead Duane, Quality Assurance Coordinator, CervicalCheck and Mrs Maeve Waldron, Laboratory Coordinator, CervicalCheck.

The date of the QA visit was confirmed some months in advance to avoid coinciding with other accreditation visits and inspections.

In preparation for the Site Visit each of the laboratories was asked to complete and return a 'CervicalCheck – QA Review, Gynaecological Cytopathology Questionnaire' and where appropriate, to provide supporting documentary evidence. In addition, with the exception of the Coombe University Hospital, the Visiting Team was also provided with copies of the CervicalCheck Cyto 1 Report 2013, Quarters 1-3. The Q4 Cyto 1 Report was subsequently provided for Quest Diagnostics. Only limited comparable data were available for the Coombe laboratory and these were provided to the Team on the day of the visit. These advance data requests provided a substantial volume of evidence to the Team and allowed a more focussed approach on the day of the actual visit.

Several days prior to the visit each of the laboratory managers was asked to extract from its archives a selection of 70 slides for examination by members of the Visiting Team (LT & MW). To minimise bias the team requested the 20 most recent consecutive cases reported from the categories of ASCUS and ASCH; and the 10 most recent consecutive cases reported as AGC, HSIL (P5) and HSIL (P6).

The Visiting Team was led either by Mrs Mairead Duane (Quest Diagnostics) or Dr Lesley Turnbull (MedLab and Coombe Hospital) who gave an outline of the proposed conduct of the visit and schedule for the day with likely timescales in respect of the subsequent report (see Appendix A). Further information/data requests were made at that time to each of the laboratories, which included requests for the following:

- **Quality Management Plan**
- **Quality Manual**
- **Five-Year Retrospective Review of HSIL+ cases - 2013 data** (to include Retrospective Review of prior negatives for current HSIL+ cases & Annual Summary for retrospective review of prior negatives) and/or Cervical Cancer audit data
- **Reportable Quality Issues (RQIs)** – Details of last 10 RQIs to include the last two cases requiring root cause analysis and/or more detailed investigation and continued surveillance
- **Staff Training Records** – training portfolios for sample of staff across spread of grades and responsibilities
- **External Quality Assurance (EQA) records**

Each of the sites was informed that a summary of the findings and proposed recommendations would be presented at the end of the visit for discussion and agreement and thereafter this would form the basis of the written report provided to the CervicalCheck Quality Assurance Committee.

Following these introductions, the visits were split between an extended inspection of the various components of case accessioning, slide preparation, screening and reporting; an examination of SOPs, the quality management plan, the quality manual and other regulatory documents; a review of pre-selected slide material; and supplemental discussion and fact finding with medical, scientific/technical and administrative/managerial staff. Wherever possible the team sought an evidence base to substantiate verbal comments. Discussions were directed to provide an assessment of professional performance, system management and compliance with CervicalCheck quality standards, CLIA and CAP requirements. The visits were conducted in a supportive and productive

manner and aimed to enhance communication at all levels and to increase understanding of the needs of each of the parties.

Wherever possible the conduct of the visits was identical between the three sites. The only exception to this was the Quest laboratory visit, where a detailed inspection of the Cytology laboratory was not undertaken as there were no significant changes to the previous visit. Instead, the Visiting Team concentrated the site inspection on the HPV-testing facility as this was the only provider using the Hybrid Capture 2 (hc2), Rapid Capture System.

In the final session, the Visiting Team met with senior medical, scientific and managerial staff to present a summary of findings, to answer any questions and to thank the organisations for their participation and cooperation. All of the organisations were reminded that changes made subsequent to the visit could not be incorporated in the visit report. Only changes of fact or additional facts not available to the Visiting Team on the day of the visit would be admissible changes to the documentation and would usually be recorded as post scripts.

MedLab Pathology Ltd., Ireland

The facility based at Sandyford Business Park, Dublin was visited on the 7th March 2014.

Site Visit findings – HR-HPV Testing

General Principles of Roche Cobas HPV DNA Test

MedLab, Ireland uses the Roche Cobas 4800 platform for HPV testing. The Roche HPV test is a real time PCR-based test that simultaneously provides individual results on the highest-risk genotypes (HPV 16 and HPV 18) and a pooled result on twelve other high-risk HPV genotypes (31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66 and 68). The automated system uses human ß-globin from the patient's cells as an internal control to assess specimen cellularity, avoiding false negatives because of an insufficient sample. The system software applies an advanced algorithm to each sample to remove outliers and manages result calculations to provide only positive, negative, or invalid patient result options without the need for a repeat testing algorithm. Only 1 positive and 1 negative control is required per run of 96 samples.

Test Procedures

The denaturation step is performed on the Cobas x 4800 instrument with amplification and detection on the Cobas z 4800 analyser. The testing process is driven by a System Control Unit which provides a stepwise wizard to guide the operator. Inbuilt safety features include a 'scan-scan-pour' requirement in which the operator has to scan the barcodes of both the required reagent and the reagent reservoir before pouring the reagent into the reservoir. When amplification and detection have finished the system produces a control graph displaying data from each of the 4 channels (HPV high-risk cocktail, HPV 16 only, HPV 18 only and ß-globin). The positive and negative controls are run for all four channels and for a test to be valid all 4 channels must have a positive result for the positive control and a negative result for the negative control. The internal ß-globin control must be detected in every sample. If it is not then the result is deemed invalid and retesting is required.

Test Considerations

Principles of good laboratory practice were evident throughout the visit and were incorporated in the Quality Manual and in SOPs. Personal protective equipment was provided to the Visiting Team and was clearly worn routinely by staff members. SOPs include advice on working practices which might influence test results. Decapping of vials is performed manually. The caps are labelled with the test accession number to ensure accurate matching of cap and vial when the test is complete. This avoids cross-contamination if re-testing were to be needed. All test disposables are bagged, sealed and disposed of by an external provider.

MedLab participates in the UK NEQAS Scheme for the Molecular Detection of HPV in which 4 test samples are provided for analysis on a quarterly basis. The pre-visit data from September 2013 showed that the laboratory had achieved a cumulative score of 24 out of 24 over the last 3 circulations, which exceeded the mean score from the 128 participating laboratories (Mean score was 23.31 with a standard error of 1.91).

System Maintenance, Calibration and Verification

All three Biomedical Scientists who undertake HPV testing were trained and certified by Roche in the use of the Cobas x 4800 instrument and z 4800 analyser.

The Cobas testing system has 24hr breakdown cover during week days. A preventive maintenance log is gathered monthly for each system and was provided to the Visiting Team for inspection. The log documents daily and weekly maintenance schedules which include shutdown and restart of the system; cleaning of the deck and tip eject plate; emptying of waste; cleaning of carriers and autoload protection ribbon; and replacement of xenon lamp and fuses as required.

Both internal maintenance routines and external maintenance contracts are monitored by the MedLab Quality Assurance Department to ensure all scheduled calibration/maintenance is completed on time.

Site Visit findings – Cytology

Sample accessioning and labelling

MedLab Pathology operates its own logistics tracking system and details of deliveries are displayed on an electronic messaging system within the specimen reception area. Cervical samples are received in UN3373 compliant transport boxes which are colour coded to indicate the area of the country from which they have originated. The vials and test request forms (TRFs) are unpacked; date stamped and matched using surname, forename and date of birth as key patient identifiers. Discrepant request forms/vials are removed and passed directly to the 'discrepancies' section for resolution. A CA accession/episode number is allocated to matched vials and request forms. Cases requiring HR-HPV testing are separated at this stage. Vials are then sorted into batches of 25 and passed to the preparation area for processing.

The TRFs are then passed to the data entry section where demographic and clinical information is entered on the Apollo Computer System. Any additional discrepancies identified at this stage are again separated and passed to 'Discrepancies'. All TRFs are then subject to a 100% Quality Control check in which the screen entries for each of 19 fields are checked against the form. Each is checked for correctness and accuracy of spelling and any errors in the initial entries are amended. Specific checks are made in respect of consent for screening; type of specimen; and visualisation of cervix. The initials of the QC checker are recorded on LIMS. Details of discrepancies are fed back to CervicalCheck and in turn passed onto the sample taker depending on the percentage of discrepancies within their workload.

Details of discrepant cytology cases are written on the front of the request form and are initialled and dated by data entry personnel. An accession label is re-printed and placed in the Data Entry Queried Samples Log. Discrepant cases are segregated into major and minor discrepancies. Minor discrepancies are usually resolved by phone call. For major discrepancies, the vial is returned to sender and the responsible doctor is required to complete the patient identifiers. In the case of 'destroyed vials' a photocopy of the vial and TRF is retained as a record but the sample is not accessioned to the laboratory. It is the responsibility of 'DE Queries' staff on the late shift to ensure that the details of all cytology samples with open queries are notified in an email to senior managers.

All discrepancies that are annotated on the front of the TRF are entered on LIMS at data entry. They are entered as either episode or reporting notes. Episode notes record general queries and

query resolution and do not appear on the report. Any details that affect the sample are recorded as reporting notes and do appear on the report. Examples include a leaking sample or minor discrepancies e.g. Bernie on vial and Bernadette on TRF.

All Cytology TRFs, Sample Reception and Data Entry Logs are scanned and stored on a daily basis.

ThinPrep™ sample processing

Each vial is checked visually for blood-staining and more heavily contaminated samples are pre-treated with glacial acetic acid. Currently approximately 5% of the total workload is pre-treated and all of these cases are processed on a single instrument to limit acid damage.

The laboratory has a suite of three Hologic T5000 (multi-sample processors) and two T2000 systems (single sample processor). The T5000 is a walk-away capable instrument that takes one 20-specimen carousel at a time, processing the specimens directly from vial to slide. It has an annual capacity of 80-90,000 samples. Unfortunately, the Hologic instrument can only handle numeric codes; consequently a second label must be applied to both the TRF and vial. The T5000 reads the numeric code/barcode and uses an inbuilt etcher to generate a labelled slide which gives the patient surname, initial of forename and CA number as cross reference. There is thus a foolproof 'chain of custody' from labelling the vial with the numeric barcode to slide generation. The slides are then stained on a Leica Autostainer XL which has an integrated coverslipper. Pertex is used as the mounting agent.

The T5000 system produces a batch report at the conclusion of each run which documents any errors. For example, a sample may be deemed too dilute, in which case the slide will remain in the carousel, flagging the error message to the operator.

All processing and staining/coverslipping instruments have 24hr breakdown cover during week days. A preventive maintenance log is gathered daily and weekly for each system and was provided to the Visiting Team for inspection.

LBC Cytology vials are tracked on an Excel spreadsheet and are retained in a unique slot for 6 weeks prior to disposal; samples for HR-HPV testing are stored for 12 weeks.

Accommodation, Facilities and Equipment

Access to the laboratory area is via a swipe card system. The laboratory is situated in modern purpose-built accommodation. The cytology service is delivered from a number of separate rooms each dedicated to a specific purpose. These include a specimen reception and accessioning area; a cytology processing laboratory; a molecular testing laboratory; a large screening room; a multiheaded microscopy/seminar room and individual pathologist offices.

The spacious processing laboratory accommodates the processing of ThinPrep™ samples, staining machines and sample storage with each of these activities occupying separate zones. The staining is checked on a daily basis by supervisory staff and recorded for inspection.

Health and safety labels are present on all pieces of equipment and service records are available for inspection. A stock rotation system is in operation and all reagents are labelled with the batch number, date of receipt and date opened. Slides are retained on-site for approximately a year and then transferred to an alternative facility where they are kept for 20 years. A spreadsheet is used to

document the position of vials allowing easy and reliable retrieval if required. An external company is employed for the safe removal and destruction of ThinPrep™ vials and other flammable reagents.

The screening room has a row of windows on its external aspect and the long internal wall is also glazed with integrated blinds. This produces a light and spacious feel which is accentuated by the use of low, semi-translucent partitions between individual screening booths. The room is air-conditioned and fully carpeted. The screening and reporting staff are provided with ergonomic chairs, tables and microscopes. All microscopes are provided with the full range of objectives required for liquid based cytology. A 10-headed microscope is available for case discussion and educational purposes. Video conferencing is available for CPC/discrepancy meetings.

Screening and reporting

Primary screening is conducted according to agreed SOPs and governed by LEAN principles. Primary screening is arranged in trays of 8 slides, each according to date processed. The screener retrieves the Apollo LIMS page and the scanned image of the TRF by scanning the etched barcode in each page of their PC screen. The slide is then matched with the Apollo page and the scanned TRF image. If any further TRF anomalies are found, they are emailed to 'MLP Stop and Fix' and the case set aside to await resolution before proceeding to slide screening.

Following primary screening, the slide result is entered on Apollo by selecting the relevant tick box options in the drop down menu. Cases are then separated using colour-coded trays according to likely diagnostic groupings. Cases considered to be ASCUS, ASC-H or AGC are passed for full secondary screen by a checker, as are cases which are clinically indicated. Cases considered to be LSIL, HSIL and above are referred directly for pathologist reporting. Cases which have HPV results pending /HPV+ results or are the first negative result after a previous abnormality also have a full second screen by a checker and if negative are signed out by the checker.

Only cases which are deemed negative or unsatisfactory are subject to a 120 sec. rapid review. If an abnormality is detected during rapid review then a full screen is undertaken, the double screen box is ticked, the report is amended and the slide referred for pathologist sign-out. All abnormal cases are therefore reported by a pathologist. In discussion, it was apparent that the opinion of a second pathologist was sought where the initial pathologist felt that a screener's opinion of high-grade should be downgraded to negative or unsatisfactory. This procedure is not documented in the SOP, which needs to be amended to reflect current practice.

It was noted that pathologists report relatively few negative slides. This was identified by MedLab as an area of possible concern prior to the Site Visit and as a consequence pathologists are given trays of negative slides for review. While this goes some way to addressing the problem, the Visiting Team felt that being provided with 'negative' slides is different to making that assessment personally and that the inclusion of negative cases is important in maintaining diagnostic baselines. The Visiting Team therefore recommends that potentially negative cases are included as part of pathologists routine diagnostic workload. Reports display the identity of the cytotechnologists/medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

Key Performance Indicators

All MedLab screening staff participate in the delivery of the CervicalCheck contract. There is no stratification of workload according to individual preference or performance indicators.

Screeners are advised that they should be able to perform an average of 8 primary screens and 8 rapid reviews per hour and may not exceed 6 hours of combined primary screening and rapid review per day. This equates with a daily workload of approximately 50 primary screens and 50 rapid reviews or 12,000 primary screens per calendar year. SOP CY-44 documents the management of poor performers. Screener performance is monitored using rolling 12-month statistics calculated monthly, quarterly and annually to assess sensitivity, specificity, workload numbers and pick-up rates. A screener is deemed to be underperforming if minimum requirements are not met in 2 out of 3 consecutive quarters. However, apart from the workload data, there are no metrics associated with any of the other parameters and it is not clear therefore what would trigger remedial action.

The Visiting Team recommends that SOP CY-44 is reviewed and enhanced to include a greater number of performance metrics with details of recommended attainment levels. It is important to note that for the CervicalCheck Cyto 1 Report, primary screening sensitivity is calculated on the basis of both ASCUS+ and HSIL+ (including ASCH and AGC favour neoplastic). These metrics differ from the UK NHSCSP sensitivity metrics which are traditionally defined as the ability to detect all grades abnormality+ (ASCUS) or moderate dyskaryosis+ (HSIL) on the initial screen, with sensitivities below 90% and 95% respectively being identified as outliers.

CervicalCheck will review and amend the current Cyto1 Report to ensure that all parties calculate sensitivity using the same metrics. It is likely that the revised sensitivity calculations will be for ASCUS+ and HSIL+, and that the addition of ASCH and AGC (favour neoplastic) to the latter category will cease.

The Visiting Team notes that SOP CY-44 recommends that '*those screeners whose pick-up rate falls to half the mean of the laboratory should have other screening performance data analysed*'. This is not appropriate and this phrase should be removed from the SOP.

The Visiting Team also recommends an expansion of the timelines for assessing under-performance. While it upholds 2 out of 3 consecutive quarters as a trigger point, it recommends an additional trigger point if an individual performance falls below minimum requirements in any 3 of 8 quarters.

All screening and reporting staff participate in the NHSCSP Gynaecological Cytology Proficiency Testing/EQA Scheme organised by West Midlands region. Detailed SOPs are in place to monitor compliance with the testing programme and to protect the quality of the service in the event of repeated underperformance triggering agreed action points. In round 1 of 2013 it is noted that 2 staff members failed to reach consensus. A root cause analysis was conducted for both individuals and corrective/preventative actions put in place, including regular multi-headed microscopy sessions.

MedLab Ireland also participates in the National External Quality Assessment Scheme for the Evaluation of Papanicolaou Staining in Cervical Cytology. The assessment for December 2013 showed that both of the slides assessed achieved a rating of 'acceptable' (overall rating is based on multi-value score and can be graded from good to acceptable, marginal or sub-standard).

CervicalCheck Statistics

Appendix E gives a breakdown of the reporting profile for CervicalCheck cases reported by MedLab, Ireland during quarters 1-3 2013.

The inadequate rate of 3.07% exceeds the 90th percentile on the 2013 CAP ThinPrep checklist and would be more akin to UK values, suggesting that NHSCSP rather than Bethesda guidelines are being followed.

The ASCUS P3 value of 1.78% lies below the 5th percentile on the 2013 CAP ThinPrep checklist and the LSIL value lies between the 10th and 25th percentiles. There is therefore a tendency to under-report low-grade disease.

In contrast, a total of 0.99% of cases was reported as HSIL (P5 & P6) and a further 0.27% as possible high-grade (ASCH). The HSIL value lies between the 75th-90th percentiles but should be interpreted with caution as the US data are based largely on laboratories serving the domestic market, which is screened annually, rather than on a population screened at three/five yearly intervals.

Comparable AGC data are hard to acquire. However, the author of the report notes that the figure of 0.06% is very similar to that of her laboratory value of 0.045%.

Individual screening data from the Cyto 1 Report show substantial but not unexpected variation both in total productivity, number of screens/hour, reporting profiles, sensitivity and specificity. For example, in Q3 2013 productivity ranged from 7.8 to 19.9 screens/hour and if calculated correctly would appear to significantly exceed the recommended workload figures quoted earlier. Screener sensitivity data for Q3 2013 show less variation than in Q1 and most individuals exceed 95% for both ASCUS+ and HSIL+ (including ASCH and AGC favour neoplastic).

There is variation in the number of cytopathologists from Q1 to Q3 but all appear likely to achieve the required 750 cases/year.

5-Year Retrospective Review / Cancer Audit

MedLab operates a retrospective review of all negative/unsatisfactory smears that were reported within 5 years of the histological reporting of the current HSIL+. Each slide is reviewed by the designated Senior Medical Scientist and the Medical Director and when both reviews have been performed the Medical Director will arrange a slide review session with the current screening staff on a rotational basis. Staff who attend the multi-headed microscopy session are required sign an attendance sheet for internal monitoring and CPD purposes. Copies of the attendance sheets were provided to the Visiting Team as part of the pre-visit questionnaire response.

As with other providers, MedLab is dependent on CervicalCheck to obtain tissue reports for correlation of Cytological and Histological outcomes. This appears to be happening with increasing ease but not all institutions are as yet fully compliant.

The Visiting Team recommends that MedLab considers the introduction of individual PPVs as well as a pan-laboratory PPV. To facilitate this enhancement, individual MedLab pathologists are invited to register with the CervicalCheck programme, if they have not already done so and to capture their unique ID on the result files. This would allow CervicalCheck to include this ID on the histology spreadsheets allowing calculation and monitoring of individual pathologist PPVs.

Reportable Quality Issues

A system of recording and monitoring errors and potential reportable quality issues is in place. The Visiting Team was provided with examples of recent incidents and their outcomes.

Slide Evaluations

70 slides were examined during the visit; 20 ASCUS, 20 ASCH, 10 HSIL P5, 10 HSIL P6 and 10 AGC. Each slide was subject to only brief review given the unavoidable time constraints and the findings must be viewed as indicative rather than absolute. Appendix E documents the outcomes of this review.

There appears to be a strong trend to under-report ASCUS, with 11 of the 20 slides being assessed as definite LSIL even on a brief review. Many of these included koilocytic lesions which should automatically be categorised as at least LSIL. 13 of the ASCH cases were agreed as ASCH on review with 6 being upgraded to HSIL. Near perfect agreement was recorded with cases reported as HSIL P5 and P6.

The pattern of reporting noted for the proffered ASCUS cases was striking and led to a discussion of reporting criteria with one of the pathologists and the lead Biomedical Scientist for Cytology. The Medical Director was unfortunately unable to attend the visit because of illness, but it became clear that he consistently under-reports koilocytic lesions, despite colleagues bringing this anomalous practice to his attention. This would certainly account for the low levels of LSIL noted in the Cyto 1 Reports, which are probably about one half of that expected in a population-based screening workload. It is unclear whether there is also systematic downgrading of cases which are primary screened as ASCUS.

The Visiting Team requires that all pathologists report according to the recommended Bethesda Terminology System. The Medical Director may benefit from a period of structured retraining to ensure his reporting characteristics fall within expected norms. Consideration should also be given to the overall consultant staffing levels as it would appear that there are only 11 sessions (6+4+1 from 3 individuals) per week, each of 3 hours duration.

Standard Operating Procedures and Quality Manual

The Visiting Team was provided with a range of SOPs for inspection and review. All displayed evidence of annual review, signed distribution lists and date placed in document control but some would benefit from greater detail and the inclusions of specific metrics.

A comprehensive quality manual is in place which includes the Quality Policy and describes the scope, purpose, organisation and management of the laboratory and it's Quality Management System. There is a records management program and record retention times are clearly defined.

Education & Training

MedLab, Ireland employs qualified biomedical scientific staff from a range of countries. Some of those will hold the UK Certificate of Competence/Certificate in Cervical Cytology. Irrespective of this, all new hires are required to undergo an induction period prior to signing out work. All trainees have to screen 2,500 slides before becoming a primary screener and 5,000 slides before being allowed to participate in rapid review and to sign-out negative reports.

All cytotechnologists are required to follow a 5-year training plan, adherence to which is monitored by the relevant supervisor and the Laboratory Manager. A 'black box' session to discuss interesting/ challenging slides is held weekly and cytotechnologists attend on a rotational basis.

Communication

Clinico-Pathological Conferences covering 10 colposcopy clinics are held via video link at roughly quarterly intervals. The discussions and action points are recorded on the pathology computer system specimen notepad but are not formally minuted or circulated. A letter is sent to the responsible clinician if a significant change to diagnosis is warranted but amended reports are not issued nor are the CervicalCheck result codes changed.

The Visiting Team suggests that CervicalCheck should facilitate discussions between laboratories and colposcopy units to agree a procedural mechanism to handle revised reports (i.e. where the change in diagnosis has clinical implications for the patient).

Visit Recommendations

The Visiting Team was particularly impressed with many of the organisational and procedural components of the visit and noted many points of good and very good practice. It is clear that MedLab works closely with Cervical Check to deliver the contract and to address any non-conformances as soon as they are identified.

Immediate recommendations:

- The Visiting Team requires that all pathologists report according to the recommended Bethesda Terminology System. The Medical Director may benefit from a period of structured retraining to ensure his reporting characteristics fall within expected norms.

Short term recommendations:

- That MedLab continues to monitor its low-grade reporting rate to ensure that genuine low-grade disease is reported accurately and managed according to current QA clinical guidelines.

- CervicalCheck will review and amend the current Cyto1 Report to ensure that all parties calculate sensitivity using the same metrics and are therefore directly comparable. It is likely that the revised sensitivity calculations will be for ASCUS+ and HSIL+, and that the addition of ASCH and AGC (favour neoplastic) to the latter category will cease. A 90% target is likely to apply to ASCUS+ and a 95% target to HSIL+. CervicalCheck will liaise with providers to ensure they are fully informed of the changes and their proposed implementation dates.

- CervicalCheck will facilitate discussions between laboratories and colposcopy units to agree a procedural mechanism to handle revised reports (i.e. where the change in diagnosis has clinical implications for the patient).

- That an additional trigger point for the assessment of individual performance is added to current SOPs which will include an individual falling below minimum requirements in any 3 of 8 quarters.

- That SOP CY-44 is reviewed and enhanced to include a greater number of performance metrics with details of required minimum attainment levels.

- That the phrase '*those screeners whose pick-up rate falls to half the mean of the laboratory should have other screening performance data analysed*' be removed from SOP CY-44, Management of Poor Performers.

- That MedLab considers the introduction of individual PPVs as well as a pan-laboratory PPV. To facilitate this enhancement, individual pathologists are invited to register with the CervicalCheck programme and to capture their unique ID on the result files. This would allow CervicalCheck to include this ID on the histology spreadsheets allowing calculation and monitoring of individual pathologist PPVs.

- That all non-conformances raised by CervicalCheck against MedLab are reviewed 30 days after implementation of a corrective/preventative action plan to ensure its effectiveness. Further, any preventative action recorded by MedLab as a result of a non-conformance/RQI raised by CervicalCheck, should reference the CervicalCheck quality number.

- That potentially negative cases are included as part of the pathologists routine diagnostic workload.

- That consideration is given to an expansion of the overall level of consultant staffing to meet the staffing levels recommended in the BSCC/BAC Codes of Practice.

Appendices & Tables

Appendix A - Site Visit Programme

Proposed Itinerary:

Morning Session: 09:00 – 13:00 hours

- Introduction and meet with screening leads for Ireland Workload
- Tour of laboratory to include cytopathology and molecular laboratory (HR-HPV testing)
    - Review pathway of cervical screening samples
    - Workload and competency assessment within the lab
    - Amended results process
    - CPC protocols

Afternoon Session: 14:00 – 17:30 hours

- Slide review by Cytopathologist of cases as advised prior to the visit
- Review of responses and documentation provided in pre-visit questionnaire
- Additional data requests
- Q & A session

Areas of good practice during the visit will be acknowledged and recommendations for service improvements will be made. Any areas of particular concern will be indicated in order that urgent action can be taken.

Appendix C – MedLab, Ireland - Performance data Q1-3 2013

Pattern Code	P1 Inad	P2 NAD	P3 ASC	P3b ASCH	P4 LSIL	P5 HSIL	P6 HSIL	P7 Query SCC	P8a AGC	P8b AGC favour neoplastic	P9 Query Glandular neoplasia	P10 Broken or damaged vial	Total
Q1 2013	1428	34558	841	114	680	124	235	10	27	9	7	74	38107
Q2 2013	1401	39491	719	116	834	151	293	4	14	9	11	66	43109
Q3 2013	1209	46584	778	124	878	167	329	3	34	4	9	20	50139
Total Q1-3 2013	**4038**	**120633**	**2338**	**354**	**2392**	**442**	**857**	**17**	**75**	**22**	**27**	**160**	**131355**
% for Q1-3 2013	**3.07**	**91.84**	**1.78**	**0.27**	**1.82**	**0.34**	**0.65**	**0.01**	**0.06**	**0.02**	**0.02**	**0.12**	**100**

Appendix E – MedLab, Ireland - rapid review of archived slides

Diagnostic category	Sub-category number	Accession number	Technical quality	Review result
ASCUS	1	140007868	good	LSIL
	2	140007922	good	ASCUS
	3	140008015	good	ASCUS
	4	140009757	good	LSIL
	5	140009769	good	LSIL
	6	140010299	good	ASCUS
	7	140010300	good	LSIL
	8	140017776	good	LSIL
	9	140018899	good	ASCUS
	10	140019607	good	LSIL
	11	140014691	good	LSIL
	12	140014138	good	LSIL
	13	140014222	good	LSIL
	14	140014296	good	LSIL
	15	140014527	poor	ASCUS
	16	140014664	good	LSIL
	17	140014666	good	ASCUS
	18	140014689	good	ASCUS
	19	140014693	good	Negative
	20	140019834	good	Negative
ASCH	1	140003823	good	ASCH
	2	140004362	good	ASCH
	3	140004699	good	Negative
	4	140020090	good	ASCH
	5	140004820	good	ASCH
	6	140002634	good	ASCH
	7	140006465	good	ASCH
	8	140006609	good	ASCH
	9	140006599	good	ASCH
	10	140007995	good	ASCH
	11	140014526	good	HSIL
	12	140014709	good	HSIL
	13	140015380	good	ASCH
	14	140015955	good	HSIL
	15	140018815	good	HSIL
	16	140018945	good	HSIL
	17	140016311	good	ASCH
	18	140017854	good	ASCH
	19	140017526	good	ASCH
	20	140017779	good	HSIL
HSIL P5	1	140014788	good	HSIL P5

	2	140014829	good	HSIL P5
	3	140014862	good	HSIL P5
	4	140016110	good	HSIL P5
	5	140014695	good	HSIL P6
	6	140010946	good	HSIL P5
	7	140017940	good	HSIL P5
	8	140017258	good	HSIL P5
	9	140016102	good	HSIL P6
	10	140016487	good	HSIL P5
HSIL P6	1	140014441	good	HSIL P6
	2	140014572	good	HSIL P6
	3	140014592	good	HSIL P6
	4	140014802	good	HSIL P6
	5	140014890	good	HSIL P6
	6	140014868	variable stain quality	HSIL P6
	7	140014871	good	HSIL P6
	8	140017886	good	HSIL P6
	9	140018064	good	HSIL P6
	10	140018298	good	HSIL P6
AGC	1	140019899	good	Negative
	2	140002442	good	AGC
	3	140005251	good	?Gland em
	4	140007530	good	AGC
	5	140007865	good	AGC
	6	140008538	good	AGC
	7	140009430	good	AGC
	8	140009462	good	Negative
	9	140009703	good	AGC
	10	140010833	good	AGC ?em

NHS
Cancer Screening Programmes

North West Cervical Screening Quality Assurance

Dr Lesley S Turnbull

NCSS Visit to US Provider Laboratories

NORTH WEST CERVICAL SCREENING QUALITY ASSURANCE REFERENCE CENTRE

Site Visit Report May 2011

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Table of Contents

Introduction & Conduct of Visits

Multidisciplinary QA site visits are an important and extremely useful element of the quality assurance repertoire and have been a usual component in the assessment of quality assurance in English cervical screening laboratories for over 10 years. While the National Cancer Screening Service (NCSS) currently gathers an array of workload and performance data relating to the two current cytology providers, the addition of site visits is likely to provide new information and a different perspective on the functioning of these services.

The purpose of these visits was to:

- Assess the performance of the local screening programme against national standards and establish reasons for any variation from these standards
- To support providers to improve their service where deficiencies are identified
- Identify areas of good practice that might be incorporated into future quality assurance guidance
- Establish whether there is good communication and co-operation between the NCSS and the provider
- Provide a forum on which to report the quality of the services provided to the Director, National Cancer Screening Service (NCSS)

The visiting QA Team comprised three individuals: an independent assessor, Dr Lesley Turnbull (Consultant Cytopathologist and Director, North West Cervical Screening Quality Assurance Reference Centre) together with Mr Patrick Cafferty, Planning & Risk Manager, NCSS and Mrs Maeve Waldron, Laboratory Coordinator, CervicalCheck.

The date of the QA visit was confirmed some months in advance to avoid coinciding with other accreditation visits and inspections. On the day prior to the visit each of the laboratory managers was asked to extract from its archives a selection of 70 slides for examination by members of the visiting

team (LT & MW). To minimise bias the team requested the 20 most recent consecutive cases reported from the categories of ASCUS and ASCH; and the 10 most recent consecutive cases reported as AGUS, HSIL (P5) and HSIL (P6).

The Visiting Team was led by Pat Cafferty who gave an outline of the schedule for the day and likely timescales in respect of the subsequent report (see Appendix A). It was made clear that a verbal report would not be provided on the day of the visit. This was followed by a brief presentation on the history and guiding principles of CervicalCheck from Maeve Waldron. Thereafter the day was split between an extended inspection of the various components of case accessioning, slide preparation, screening and reporting; an examination of SOPs, the quality manual and other regulatory documents; a review of pre-selected slide material; and supplemental discussion and fact finding with medical, scientific/technical and administrative/managerial staff. Wherever possible the team requested an evidence base to substantiate verbal comments. These sessions were directed to provide an assessment of professional performance, system management and compliance with NCSS quality standards, GLP and CAP requirements. The visits were conducted in a supportive rather than inspectorial manner and have hopefully provided a route by which communication can be expanded and acknowledged problems discussed in an open and fruitful medium.

In the final session, the Visiting Team met with senior medical and scientific staff to answer any questions and to thank the organisations for their participation and cooperation. Both commercial organisations were reminded that changes made subsequent to the visit could not be incorporated in the visit report. Only changes of fact or additional facts not available to the Visiting Team on the day of the visit would be admissible changes to the documentation and would usually be recorded as post scripts.

Quest Laboratories

The facility based at Teterboro, New Jersey was visited on the 12th May 2011.

Sample accessioning and labelling

Samples are collated at a central point in Haddington Road, Dublin where they are packed in transport boxes for collection by DHL. Assignments are delivered to Teterboro at approximately 11.30 hrs each day. The transport boxes are UN3373 marked and compliant. Samples are accessioned in a section of the reception area dedicated to cytological specimens. The accession clerk handles cases singly, checking the patient's name, date of birth and IPSS number on Care 360 and on the vial and request card. If all of these data items match then the case is processed and the data transferred to ISIS. Bar code labels are printed and applied to both the vial and request form. The bar code includes the clerk's initial and the destination of the test i.e. ThinPrep.

Samples are delivered in trays each containing 24 vials which are allocated a batch number on ISIS. Batches of slides are labelled using an etching machine. The vials are scanned sequentially and the data transferred electronically to the etcher which automatically burns a bar code on the slide together with the case accession number, the woman's surname and first initial of forename. This sequence ensures the 'chain of custody' from vial to slide and to subsequent report.

Accommodation, Facilities and Equipment

Access to the laboratory area is via a swipe card system. The laboratory is situated in modern purpose-built accommodation. The cytology service is delivered from a number of separate rooms each dedicated to a specific purpose. These include a specimen reception and accessioning area, with a dedicated section for cytology; a processing laboratory; two screening rooms; a multiheaded microscopy room and individual pathologist offices.

The spacious preparation room accommodates the processing of ThinPrep ™ and SurePath™ samples, staining machines and non-gyn sample preparation with each of these activities occupying separate zones. Three Sakura Tissue-Tek Prima linear staining and coverslipping

machines are available with integrated exhaust systems to evacuate xylene fumes. The staining is checked on a daily basis by supervisory staff and recorded for inspection. ThinPrep™ samples are processed using six separate banks, each of four T2000 machines. A single operator controls a bank of four T2000 machines.

Health and safety labels are present on all pieces of equipment and service records are available for inspection. A stock rotation system is in operation and all reagents are labelled with the batch number, date of receipt and date opened. Vials are stored in fire-proof cabinets. Slides are retained on-site for approximately a year and then transferred to an alternative facility where they are kept for 20 years. A bar-coded banking system is used for both vials and slides allowing easy and reliable retrieval. Vials are destroyed using a vial 'eater' which shreds the vials and destroys patient identifiable data.

Both screening rooms are divided by intermediate height partitions into individual booths optimising screening conditions. The rooms are spacious, light, air-conditioned and fully carpeted. The screening and reporting staff are provided with ergonomic chairs, tables and microscopes. All microscopes are provided with the full range of objectives required for liquid based cytology. A 20-headed microscope is available for case discussion and educational purposes. One such session was in progress during the visit and members of the Visiting Team were invited to participate. Double-headed microscopes and camera facilities are also provided in individual pathologist offices. Video conferencing is available for MDT/discrepancy meetings.

ThinPrep™ sample processing

Processing staff receive trays of 24 vials and pre-labelled slides. The operator checks the demographics on both the vial and slide before placing both in the T2000. The check includes the patient's surname, first initial of forename and slide number. Samples are processed one at a time rather than as a group. This reduces the potential risk of transposing either the slide or vial and minimises the risks inherent in single sample processing.

Screening and reporting

Primary screening is conducted according to agreed SOPs and a full double screen is undertaken on all NCSS slides. Reporting follows the NCSS national standard classification system. Data from the request form are transferred by transcriptionists and are then accessed by cytotechnologists on screen. Scanning the slide barcode displays the case and the first screener can enter his/her opinion via pre-defined hot keys. This process is repeated for the second screener who will also enter the P&R codes using the NCSS Cytology Terminology Translation Table. A QC cytotechnologist will then check the result, including the P&R code prior to final authorisation. Cytology supervisors provide feedback to all cytotechnologists on the accuracy of P&R codes.

There is therefore a final independent check of the accuracy of the result and management recommendations prior to authorisation.

Reports display the identity of the cytotechnologists/medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

Key Performance Indicators

All Quest screening staff participate in the delivery of the NCSS contract. There is no stratification of workload according to individual preference or performance indicators. Quest was unable to segregate NCSS work from other clinical workloads and it was clear that screeners typically undertook work from a range of different clients during any single working day. It was therefore unable to provide assurance that screening staff were compliant with NCSS 'Quality Assurance in Cytopathology' para 5.2.2.3, workload requirements (primary screening). In particular, that primary screeners do not exceed 6 hours primary screening per day with a maximum of 60-80 LBC samples in any 24 hour period.

The NCSS data are not currently used as standalone performance indicators.

Quest has implemented a Cytotechnologist Performance Assessment Program (CPAP) which applies to all cytotechnologists who undertake primary screening of cervical cytology cases. The program collects data on primary and rescreening interpretations on a rolling basis, calculating metrics, providing monthly feedback and determining the need for corrective action based on an objective analysis of those metrics.

Variances are defined as a final impression of LSIL or higher where the initial screening impression is either negative, unsatisfactory or unqualified repair or reactive changes.

The performance metrics evaluated within the programme include monthly variance percentage; monthly ASC, UNSAT and NECC (no endocervical cells or TZ material identified) ratios; monthly ASC/SIL ratios; monthly SIL percentage; monthly slides/hour; rolling 3 month variance percentage; rolling 12 month SIL ratio; and rolling 12 month Sigma Score. The latter metric assumes that variances in all QC are weighted equally. The Sigma Score is calculated using data from the previous 12 months and is used as a long-term measure of the quality of an individual. The rolling 12-month Sigma Score is recalculated from the Index Day of each screening variance and recorded on the Interim Variance Performance Form. A combination of these various performance indicators is used to assess whether corrective actions are required. These include targeted continued education; increasing the percentage of cases subject to QC; setting a New Workload Limit by decreasing the number of slides screened/hour; and by restricting privileges.

All screening and reporting staff participate in Proficiency Testing. Detailed SOPs are in place to monitor compliance with the testing programme and to protect the quality of the service until corrective actions are completed and a pass mark achieved. There are four annual testing opportunities and

the pass mark is 90%. The first test and second retest comprise a set of 10 slides with a time limit of 2 hours. The third and fourth retests comprise 20 slides with a 4-hour time limit. An individual who does not achieve a pass on the first test must be retested with a second 10-slide test within 45 days of notification of failure. Second and subsequent failures require escalating educational interventions and documented re-examination of all slides examined by that individual.

Only very limited amounts of personal performance data were available for scrutiny. However, in the small amount of data provided, there appeared to be substantial variation in the reporting profiles of individual pathologists.

NCSS Statistics

Appendix E gives a breakdown of the reporting profile for NCSS cases reported by Quest during 2010 and in the 1st quarter 2011.

Population-based screening is in its relative infancy in Ireland although opportunistic screening has been widely available for some considerable time. There will therefore be a mixture of both prevalent and incident disease within the population and expected abnormality rates are difficult to predict with any certainty. There are, however, some values which give cause for concern and which impact on other elements of the programme, particularly colposcopy.

The inadequate rate of 0.60% is within the expected range for slides reported using Bethesda adequacy criteria.

The ASCUS P3a value of 9.45% lies between the 90th-95th percentiles for CAP. The achievable standard in England for the combined diagnostic categories of Borderline/Mild (Bethesda categories ASCUS/LSIL) is between 4.0-7.5% (10th-90th percentile range). The comparable figure of 14.14% substantially exceeds the upper limit of that range.

A total of 1.67% of cases was reported as HSIL (P5 & P6) or possible high-grade (ASCH). The ASCH value again lies between the between the 75th-90th percentile for CAP with the HSIL value also between the 75-90th percentiles.

The histological outcomes are unknown for many of these cases and it is not therefore possible to ascertain 'true disease' rates by calculating PPVs (positive predictive values). This information is clearly required as it will provide valuable feedback to laboratories and can be used to both monitor and influence reporting practices.

Slide Evaluations

70 slides were examined during the visit; 20 ASCUS, 20 ASCH, 10 HSIL P5, 10 HSIL P6 and 10 AGUS. Each slide was subject to only brief review given the unavoidable time constraints and the findings must be viewed as indicative rather than absolute. Table 2 documents the outcomes of this review.

There would appear to be a general trend to over-report ASCUS, ASCH and AGUS cases. Good agreement was recorded with cases reported as HSIL P5 and P6. This pattern of reporting is not unexpected and is safe, conservative and protective to the parent organisation. However, it is likely to result in unnecessary repeat smears and referrals to colposcopy and places a significant additional financial burden on the programme.

Standard Operating Procedures and Quality Manual

The Visiting Team was provided with an impressive array of SOPs for inspection and review. Those examined were of high quality with substantial detail of the procedures covered. All displayed evidence of annual review, signed distribution lists and date placed in document control.

A comprehensive quality manual is in place which includes the Quality Policy and describes the scope, purpose, organisation and management of the laboratory and it's Quality Management System. There is a records management program and record retention times are clearly defined.

Education & Training

All cytotechnologists are required to obtain a minimum of 12 hours of continued education (CE) per calendar year, divided evenly between didactic and multi-headed microscopy sessions and including off-site and interlaboratory comparison programmes. The organisation encourages every cytotechnologist to attend a national or regional meeting every few years and to attend state or local meetings every other year. Time spent examining proficiency testing slides is not included. CE credits must be documented and that documentation provided to supervisory staff.

Communication

Monthly video conferences are conducted between Quest pathologists, colposcopists and members of NCSS to discus discrepant and/or interesting cases. There is regular dialogue and email correspondence between Quest and NCSS on a wide range issues. The Director of Anatomic Pathology is due to visit Limerick in the near future.

Visit Recommendations

The organisational and procedural components of the visit were found to be satisfactory and no recommendations are made in respect of these areas. The Visiting Team noted many points of good and very good practice.

The Visiting Team was aware that little information was available which was specific to the NCSS workload and it was therefore difficult to accurately assess the performance of the service or whether all aspects of the service were compliant with contractual obligations. Performance indicators focused primarily on the individual and many of the metrics include only a small percentage of the total cases examined by any one individual.

It is likely that additional data items will be required to allow a more accurate evaluation of the CervicalCheck programme. The author urges the company to work collaboratively with the NCSS to achieve this aim.

Appendices & Tables

Appendix A - Site Visit Programme

09.30	Meet with Lab Manager /QA Manager / Lead Pathologist / Operations Manager as appropriate
09.45	Overview of CervicalCheck Programme to include its goals and objectives
10.00 – 11.30	Verification of laboratory processes and procedures based on College of American Pathologists, Cytopathology Accreditation Checklist and good laboratory practice. The sample pathway will be scrutinised from reception and data entry, through processing, screening and reporting to authorisation and queuing reports for printing

11.30	Review of Standard Operating Procedures, Audit records, CPC attendance and non-conformance procedures	
LUNCH		
14.00 – 16.00	Slide review session – Dr Turnbull and Mrs Maeve Waldron	Review of Quality Management System – Pat Cafferty
16.00 – 16.45	Supplementary time for additional data requests	
16.45 – 1800	Question and answer session	

Appendix B – Quest screening data – Q1-4 2010 & Q1 2011

Numbers and percentages of cases by source of sample and diagnostic category

count of Accession Number	P1 Inad	P2 NAD	P3 ASC	P3a	P3b	P4 LSIL	P5 HSIL	P6 HSIL	P7 query SCC	P8 AGC	P8a	P8b	P9 Query Glandular Neoplasia	P10 broken or damaged vial	Grand Total
Grand Total Teterboro	183	31814	3447			1379	193	203	26	322			7	129	37703
% Q1 2010	0.49	84.38	9.14			3.66	0.51	0.54	0.07	0.85			0.02	0.34	100.00
Grand Total Teterboro	314	40951	4223			1638	185	228	3	405			2	249	48198
% Q2 2010	0.65	84.96	8.76			3.40	0.38	0.47	0.01	0.84			0.00	0.52	100.00
Grand Total Teterboro	338	38232	2743	935	51	1382	183	161	4	181	56	5	1	234	44506
% Q3 2010	0.76	85.90	6.16	2.10	0.11	3.11	0.41	0.36	0.01	0.41	0.13	0.01	0.00	0.53	100.00
Grand Total Teterboro	357	39865		3715	257	1549	220	225	3		243	17	3	163	46617
% Q4 2010	0.77	85.52		7.97	0.55	3.32	0.47	0.48	0.01		0.52	0.04	0.01	0.35	100.00
Grand Total Teterboro	249	34595		3921	272	1672	230	191	4		200	17	5	142	41498
% Q1 2011	0.60	83.37		9.45	0.66	4.03	0.55	0.46	0.01		0.48	0.04	0.01	0.34	100.00

Table 1 – Quest rapid review of archived slides

	Sub-category No	Requisition No	Accession No	Technical quality	Review result
ASCUS	1	255860	EC112057897	good	LSIL
	2	256163	EC112057953	good	ASCUS
	3	256033	EC112057942	good	Negative
	4	255951	EC112058010	good	Negative
	5	255907	EC112058161	good	ASCUS
	6	255950	EC112057924	good	Negative
	7	256424	EC112057859	good	ASCUS
	8	255833	EC112057894	good	Negative
	9	256030	EC112058178	good	Negative
	10	256373	EC112058443	good	ASCUS
	11	256249	EC112057870	good	Negative
	12	256258	EC112058427	good	Negative
	13	256000	EC112058242	good	ASCUS
	14	255946	EC112058202	good	ASCUS
	15	255920	EC11205920	good	Negative
	16	255790	EC112058181	good	Negative
	17	255796	EC112058352	good	Negative
	18	256091	EC112058112	good	ASCUS
	19	256272	EC112057875	good	ASCH
	20	255958	EC112057909	good	Negative
ASCH	1	256120	EC112058271	good	ASCH
	2	256219	EC112057962	good	Negative
	3	256020	EC112057838	good	Negative
	4	255828	EC112057802	good	ASCH
	5	256383	EC112057756	good	ASCH
	6	254523	EC112056458	good	ASCH
	7	254429	EC112056337	good	Negative
	8	254174	EC112055929	good	Negative
	9	253960	EC112055794	good	ASCUS
	10	253900	EC112055785	good	Negative
	11	253564	EC112055462	good	Negative
	12	255290	EC112057490	good	Negative
	13	252678	EC112055216	good	ASCH
	14	253077	EC112055156	good	Negative
	15	253165	EC112054880	good	Negative
	16	252883	EC112054728	good	HSIL P5
	17	252451	EC112054274	good	ASCUS
	18	252613	EC112054180	good	ASCH
	19	251968	EC112053951	good	Negative
	20	251739	EC112053832	good	Negative
HSIL P5	1	256550	EC112058216	good	HSIL P5
	2	255802	EC112058182	good	HSIL P5
	3	255869	EC112058000	good	LSIL

		4	255481	EC112057662	good	HSIL P5
		5	255028	EC112057631	good	HSIL P5
		6	255154	EC112057171	good	ASCUS
		7	255647	EC112056992	good	HSIL P5
		8	254495	EC112056906	good	HSIL P5
		9	254677	EC112056654	good	LSIL
		10	254670	EC112056653	good	ASCUS
HSIL P6		1	256167	EC112057954	good	HSIL P5
		2	256339	EC112057752	good	HSIL P6
		3	255803	EC112057730	good	HSIL P6
		4	256479	EC112057710	good	HSIL P6
		5	255605	EC112057517	good	HSIL P6
		6	255522	EC112057441	good	HSIL P6
		7	255219	EC112057346	good	HSIL P6
		8	255158	EC112057338	good	HSIL P6
		9	255468	EC112057271	good	HSIL P6
		10	255711	EC112057142	good	HSIL P6
AGUS		1	255155	EC112057400	good	Negative
		2	253733	EC112055408	good	Negative
		3	253873	EC112055436	good	AGUS
		4	253926	EC112055441	good	Negative
		5	254009	EC112055690	good	ASCH
		6	255474	EC112057272	good	AGUS
		7	253809	EC112055402	good	Negative
		8	256214	EC112057961	good	Negative
		9	254881	EC112056357	good	ASCUS
		10	254464	EC112056919	good	HSIL P6

Site Visit Report March 2014

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Introduction & Conduct of Visits

The recent CervicalCheck Quality Assurance visits represent the second round of QA Site Visits, the first round having been conducted in May 2011. Since those initial visits, CervicalCheck has undertaken a retendering exercise for the provision of Cervical Cytology services and limited reflex HR-HPV testing and the refreshed contract has allowed for the repatriation of approximately half of the total workload. There are now three separate provider laboratories: two based in Ireland (Coombe Women & Infants University Hospital, Cork Street, Dublin and MedLab Pathology Ltd., Sandyford Business Park, Dublin) and one in the US (Quest Diagnostics Incorporated, Teterboro, New Jersey).

The workload previously performed by MedLab Pathology Ltd., Austin, Texas transferred to MedLab Pathology Ltd., Ireland. While both of these organisations are subsidiaries of Sonic Healthcare Group, the laboratory based in Sandyford is an autonomous organisation with different working practices and SOPs to those used in Austin, Texas. Consequently, both the Sandyford and Coombe University Hospital laboratories have been treated as new providers for the purposes of the current visit. Only the Quest Laboratory has been treated as a 'true' second round provider.

This current round of Site Visits aims to build on the experience and data gathered in the first round. The purpose of these visits was to:

- To determine, where appropriate, whether the recommendations from the previous round of QA Site Visits conducted in 2011 have been incorporated into current working practice
- To assess the performance of the local screening programme against national standards and establish reasons for any variation from these standards
- To support providers to improve their service where deficiencies are identified
- Identify areas of good practice that might be incorporated into future quality assurance guidance
- Establish whether there is good communication and co-operation between the CervicalCheck and between the various provider organisations
- Provide a forum to report on the quality of the services to the Director, National Cancer Screening Service (CervicalCheck)

The visiting QA Team comprised three individuals: an independent assessor, Dr Lesley Turnbull (Consultant Cytopathologist and Lead for Cytology, Betsi Cadwaladr University Health Board; previously Quality Assurance Director, NHS North West Cervical Screening Quality Assurance); Mrs Mairead Duane, Quality Assurance Coordinator, CervicalCheck and Mrs Maeve Waldron, Laboratory Coordinator, CervicalCheck.

The date of the QA visit was confirmed some months in advance to avoid coinciding with other accreditation visits and inspections.

In preparation for the Site Visit each of the laboratories was asked to complete and return a 'CervicalCheck – QA Review, Gynaecological Cytopathology Questionnaire' and where appropriate, to provide supporting documentary evidence. In addition, with the exception of the Coombe University Hospital, the Visiting Team was also provided with copies of the CervicalCheck Cyto 1 Report 2013, Quarters 1-3. The Q4 Cyto 1 Report was subsequently provided for Quest Diagnostics. Only limited comparable data were available for the Coombe laboratory and these were provided to the Team on the day of the visit. These advance data requests provided a substantial volume of evidence to the Team and allowed a more focussed approach on the day of the actual visit.

Several days prior to the visit each of the laboratory managers was asked to extract from its archives a selection of 70 slides for examination by members of the Visiting Team (LT & MW). To minimise bias the team requested the 20 most recent consecutive cases reported from the categories of ASCUS and ASCH; and the 10 most recent consecutive cases reported as AGC, HSIL (P5) and HSIL (P6).

The Visiting Team was led either by Mrs Mairead Duane (Quest Diagnostics) or Dr Lesley Turnbull (MedLab and Coombe Hospital) who gave an outline of the proposed conduct of the visit and schedule for the day with likely timescales in respect of the subsequent report (see Appendix A). Further information/data requests were made at that time to each of the laboratories, which included requests for the following:

- **Quality Management Plan**
- **Quality Manual**
- **Five-Year Retrospective Review of HSIL+ cases - 2013 data** (to include Retrospective Review of prior negatives for current HSIL+ cases & Annual Summary for retrospective review of prior negatives) and/or Cervical Cancer audit data
- **Reportable Quality Issues (RQIs)** – Details of last 10 RQIs to include the last two cases requiring root cause analysis and/or more detailed investigation and continued surveillance
- **Staff Training Records** – training portfolios for sample of staff across spread of grades and responsibilities
- **External Quality Assurance (EQA) records**

Each of the sites was informed that a summary of the findings and proposed recommendations would be presented at the end of the visit for discussion and agreement and thereafter this would form the basis of the written report provided to the CervicalCheck Quality Assurance Committee.

Following these introductions, the visits were split between an extended inspection of the various components of case accessioning, slide preparation, screening and reporting; an examination of SOPs, the quality management plan, the quality manual and other regulatory documents; a review of pre-selected slide material; and supplemental discussion and fact finding with medical, scientific/technical and administrative/managerial staff. Wherever possible the team sought an evidence base to substantiate verbal comments. Discussions were directed to provide an assessment of professional performance, system management and compliance with CervicalCheck quality standards, CLIA and CAP requirements. The visits were conducted in a supportive and productive

manner and aimed to enhance communication at all levels and to increase understanding of the needs of each of the parties.

Wherever possible the conduct of the visits was identical between the three sites. The only exception to this was the Quest laboratory visit, where a detailed inspection of the Cytology laboratory was not undertaken as there were no significant changes to the previous visit. Instead, the Visiting Team concentrated the site inspection on the HPV-testing facility as this was the only provider using the Hybrid Capture 2 (hc2), Rapid Capture System.

In the final session, the Visiting Team met with senior medical, scientific and managerial staff to present a summary of findings, to answer any questions and to thank the organisations for their participation and cooperation. All of the organisations were reminded that changes made subsequent to the visit could not be incorporated in the visit report. Only changes of fact or additional facts not available to the Visiting Team on the day of the visit would be admissible changes to the documentation and would usually be recorded as post scripts.

Quest Diagnostics Inc., Teterboro

The facility based at Teterboro, New Jersey was visited on the 24th February 2014.

Site Visit findings – HR-HPV Testing

General Principles of hc2 High-Risk HPV DNA Test

HPV testing of CervicalCheck specimens is performed using the Hybrid Capture 2 (hc2) High-Risk HPV DNA Test. This is a nucleic acid hybridisation assay with signal amplification using microplate chemiluminescence for the qualitative detection of thirteen high-risk types of HPV DNA in cervical samples. The high-risk HPV types detected by the assay include 16/18/31/33/35/39/45/51/52/56/58/59/68. The hc2 High-Risk HPV DNA Test cannot identify the specific HPV type(s) present.

An aliquot from the ThinPrep vial is initially denatured to obtain DNA and this is then hybridised with a specific cocktail of HPV RNA probes. The resultant RNA:DNA hybrids are captured onto the surface of a microplate well which is coated with antibodies specific for those hybrids. The immobilised hybrids are then incubated with alkaline phosphatase conjugated antibodies specific for the RNA:DNA hybrids. Each antibody molecule is conjugated with several alkaline phosphatase molecules and multiple conjugated antibodies bind to each captured hybrid producing substantial signal amplification. A chemiluminescent substrate is then added to the test sample, which is cleaved by the bound alkaline phosphatase to emit light which is measured as relative light units (RLUs) on a luminometer. The intensity of the light emitted denotes the presence or absence of target DNA in the specimen.

An RLU measurement equal to or greater than the Cutoff (CO) Value indicates the presence of HPV DNA sequences in the specimen. An RLU measurement less than the Cutoff Value indicates the absence of the specific DNA sequences tested or HPV DNA levels below the detection limit of the assay.

Test Procedures

Specimens which require HR-HPV testing in addition to cytological examination are identified at the specimen reception centre in Dublin and a test run list is sent to the Teterboro facility. At Teterboro, the specimens are initially presented for cytological examination according to the protocols described in the previous QA Site Visit report (2011). The vials are then forwarded to the Molecular Testing unit where separate areas are identified for manual and automated vial decapping and pipetting; sample denaturation and hybridisation; and test reading.

Specimens are run in an eight-microwell column configuration and maintenance of this configuration throughout the various stages in the testing process is critical to specimen identification and hence to the 'chain of custody'. A software application template is used to create a control/calibrator/specimen plate layout (Figure 1).

HPV testing is performed on a daily basis. Vials are identified by test accession number, patient surname, first initial of forename and code number and checked against the test list. Specimen decapping and pipetting are performed manually if the run size is less than 15; larger runs use the **QIAensemble System** which automatically unscrews (or "decaps") the lids of the vials and pipettes

an aliquot into a testing vial, before recapping the clinical sample. When this is done manually both the vials and caps are placed in the order pre-defined by the run layout template to ensure accurate matching when the caps are replaced. Only the first and last test specimens are labelled with the patient identifiers.

Layout of Run of 24 Microwells			
Row	**Column**		
	1	**2**	**3**
A	NC	Specimen 1	Specimen 9
B	NC	Specimen 2	Specimen 10
C	NC	Specimen 3	Specimen 11
D	HRC	Specimen 4	Specimen 12
E	HRC	Specimen 5	Specimen 13
F	HRC	Specimen 6	Specimen 14
G	QC1-LR	Specimen 7	Specimen 15
H	QC2-HR	Specimen 8	EPC

Figure 1: Example layout of run of **24 microwells**. Key: NC - Negative Calibrator; HRC - High-Risk HPV Calibrator; QC1-LR - Low Risk Kit QC (High Risk negative, Low Risk positive; QC2-HR - High Risk Kit QC (High Risk positive, Low Risk negative); EPC - External Positive Control.

Specimen aliquots can be denatured manually or using the Rapid Capture System (RCS). When performed manually an indicator dye is added to the Denaturation Reagent which changes from a dark purple to pink/orange when added to the cell pellet. This provides a visual check that Denaturation Reagent has been added to each test tube.

To maintain a 'chain of custody' when using the Rapid Capture System it is important to correctly orientate the plates such that the A1 well position is in the back left corner. The Hybridisation and Capture plates must correspond and both should be labelled on the front side with numbers 1 through 4. The Capture Microplate should be covered after the wash step and during Detection Reagent 2 incubation to prevent contamination with exogenous alkaline phosphatase, which may produce false positive results.

The user is required to retrieve the microplates from the Rapid Capture System deck at the end of the DR2 incubation period and to place them in the DML 3000 luminometer for reading. The DML 3000Assay Protocol Software then generates the final qualitative results based on the RLU/CO values.

Test Considerations

The Hybrid Capture 2 (hc2) High-Risk HPV DNA Test is a non-amplification technique and does not therefore require the separation of pre- and post-amplification processes.

Principles of good laboratory practice were evident throughout the visit and were widely incorporated in the Quality Manual and in SOPs. Personal protective equipment was provided to the Visiting Team and was clearly worn routinely by staff members. SOPs include advice on working practices which might influence test results. This includes recommendations on cleaning and covering work surfaces with disposable pads and the wearing of powder-free gloves to reduce contamination by environmental nucleases which are present on human skin. Further advice is given on exogenous alkaline phosphatases which are present in non-approved paper towels, bacteria, saliva, hair and oils from skin.

Proficiency testing is done using College of American Pathology CAP CHPV-A, B, C; Instand External Quality Assessment Scheme; or New York State NYS HPV PT surveys. The proficiency samples are run as per patient samples.

System Maintenance, Calibration and Verification

Three Rapid Capture Systems are available in the Teterboro laboratory. All have 24hr breakdown cover during week days. A preventive maintenance log is gathered monthly for each system and was provided to the Visiting Team for inspection. The log documents the replacement of syringes, tubing and tip adapters; records a range of tests and verification procedures; and includes the saving of machine files both to disk and memory stick.

The RCS employs liquid-level sensing when dispensing reagents from troughs to a plate. If insufficient (or no) volume is dispensed, the system will pause, display a dialogue box indicating the problem, and signal the user with an audible alarm. One of the verification procedures in the preventive maintenance log specifies the weighing of hybridisation plates before and after the dispensing of reagents to monitor dispensed volume. The Team was provided with copies of this log showing that the weights were within expected tolerance limits.

The hc2 High-Risk HPV DNA Test requires calibration with each test run i.e. with each plate of 96 wells. This ensures that the reagents and control/calibrator material are functioning properly and giving an accurate determination of assay cut-off (CO) value. These calibrations involve the following values:

- The **Negative Calibrator** must be run in triplicate with each test run. The Negative Calibrator mean must be ≥10 and ≤250 RLUs in order to proceed. The Negative Calibrator results should show a coefficient of variation (%CV) of ≤25%. If the %CV is >25%, the instrument discards the calibrator value with an RLU value furthest from the mean as an outlier and recalculates the mean using the two remaining calibrator values. If the difference between the mean and each of the two values is ≤25% the instrument proceeds to calculate patient results. If the difference is >25% the assay calibration is invalid and the test run must be repeated for all patient specimens.

- The **High Risk HPV Calibrator(s)** must also be run in triplicate with each test run. The High Risk HPV Calibrator results should show a coefficient of variation of ≤15%. If the %CV is >15%, the instrument discards the calibrator value with an RLU value furthest from the mean as an outlier and recalculates the mean using the two remaining calibrator values. If the difference between the mean and each of the two values is ≤15% the instrument proceeds to calculate patient results. If the difference is >15% the assay calibration is invalid and the test run must be repeated for all patient specimens.

- A calibration verification failure must be documented in the QC book/log in the department and signed by the Departmental Manager/Supervisor.

- The values of **Kit Controls** are documented. The Low-Risk Kit QC (High Risk negative (HPV 6)) must give an RLU/CO value of <1.0 to be valid. The High-Risk QC (High Risk positive (HPV 16)) must give a value of ≥2.0 and ≤8.0. If either Kit Control fails the run is considered invalid and must be repeated.

- New lots of **External Positive Control** are used in parallel with an old lot before being used for patient testing. The RLU/CO value of individual External Positive Controls must be ≥1.0 RLU/CO for the run to be accepted. Runs in which the external controls are ≤1.0 RLU/CO must be rejected.

- **Levey-Jennings plots** of results from all controls are used to detect trends and deviations, such as an unusually high percentage or clustering of results, or unusually high percentage of negative or equivocal results. If an unusual pattern of results is evident the departmental Supervisor is informed.

The luminometer plate check is run each day prior to testing to ensure the light path is correctly aligned. If the check fails the instrument is removed from service until realigned.

Report issue and re-issue

ThinPrep PreservCyt specimens with RLU/CO values of ≥2.5 are considered positive/detected. PreservCyt specimens with an RLU/CO value from 1.0 to <2.5 must be retested. (Note this value incorporates advice from the FDA which identified a bias when using the RCS compared to the manual method. A correction factor has now been incorporated into the software for samples that fall between 0.8 and 1.0 RLU/CO.)

In the retest algorithm, samples with retest values of ≥1.0 RLU/CO values are reported as positive. Those with values of <1.0 RLU/CO are subjected to a second retest and again regarded as positive if ≥1.0 RLU/CO and negative if <1.0 RLU/CO.

Patient reports can be reissued either as revised reports or as addenda. A revised report is one in which one or more changes have been made to a previously reported result. An addendum is where the changes involve the addition of new information and none of the changes involve revising a test result. If a revised report is issued the Cytology Department is notified and the entire accession is re-reported to the CervicalCheck.

Site Visit findings – Cytology

Screening and reporting

Cytotechnologists confirm the patient's ID on both the request form and slide and review the history file. The manual transcription of patient history by transcriptionists has now ceased and has been replaced by the electronic transfer of data into QPS. This appears to be working satisfactorily and final QC checks are in progress prior to full implementation. Primary screening is conducted according to agreed SOPs and the results entered into the LIS system using P&R codes. All negative and unsatisfactory cases are rescreened by a second screener who is qualified to undertake QC. For routine cases this is performed via an FOV check using ThinPrep Imager computer assisted screening. A full

second manual screen is only performed on cases which are deemed abnormal or potentially abnormal from this review or which have abnormal histories or a high probability of developing cervical cancer. All abnormal cases are referred to a pathologist for reporting.

A QC cytotechnologist will then check the result, including the P&R code prior to final authorisation. Cytology supervisors provide feedback to all cytotechnologists on the accuracy of P&R codes.

There is therefore a final independent check of the accuracy of the result and management recommendations prior to authorisation.

Cases which have been selected for HR-HPV testing are allocated an 'RO' code to allow integration of the cytology and virology results. The primary screener is not usually aware of the HPV findings, but the second screener/QC authoriser will be aware of this result to finalise the report.

Reports display the identity of the cytotechnologists/medical scientist and/or cytopathologist responsible for the conclusion and recommendation.

Key Performance Indicators

Quest operates a Cytotechnologist Performance Assessment Program (CPAP) to assess the performance of all cytotechnologists who undertake primary screening of cervical cytology cases. The CPAP reviews are performed monthly and include both US domestic and CervicalCheck metrics. The program collects data on primary and rescreening interpretations on a rolling basis, calculating metrics, providing monthly feedback and determining the need for corrective action based on an objective analysis of those metrics.

Variances are defined as a final impression of LSIL or higher (LSIL+) where the initial manual screening impression is either negative, unsatisfactory or unqualified repair or reactive changes; or where the FOV plus full screen impression is negative and the final impression is LSIL + or where the FOV-only impression is negative but LSIL+ cells are within an FOV and the final impression is LSIL+.

The performance metrics evaluated within the programme include monthly variance percentage; monthly ASC, UNSAT and NECC (no endocervical cells or TZ material identified) ratios; monthly ASC/SIL ratios; monthly SIL percentage; monthly slides/hour; rolling 3 month variance percentage; rolling 12 month SIL ratio; and rolling 12 month Sigma Score. The latter metric assumes that variances in all QC are weighted equally. The Sigma Score is calculated using data from the previous 12 months and is used as a long-term measure of the quality of an individual. The rolling 12-month Sigma Score is recalculated from the Index Day of each screening variance and recorded on the Interim Variance Performance Form. A combination of these various performance indicators is used to assess whether corrective actions are required. These include targeted continued education; increasing the percentage of cases subject to QC; setting a New Workload Limit by decreasing the number of slides screened/hour; and by restricting privileges.

Conditions which may determine the need for corrective actions include a 12-month Sigma Score of <4.2; a 12-month sensitivity of <97%; a 3-month variance of >0.30%; a 12-month SIL ratio of <0.60 and current SIL% <1.0%; and Non-FOV slides/hour <7.0 or Unwtd FOV slides/hour <11.0 and not in grace period and QA metrics are in range.

For the purposes of CervicalCheck contract monitoring, performance data are calculated on the basis of all cases (CervicalCheck and non- CervicalCheck) and CervicalCheck cases only. It is important to note that primary screening sensitivity for CervicalCheck cases is calculated on the basis of both ASCUS+ and HSIL+ (including ASCH and AGC favour neoplastic). These metrics differ from the Quest sensitivity metric which is defined as the ability to detect SIL+ on the initial screen, with sensitivity below 97% being identified as an outlier.

All screening and reporting staff participate in Proficiency Testing. Detailed SOPs are in place to monitor compliance with the testing programme and to protect the quality of the service until corrective actions are completed and a pass mark achieved. There are four annual testing opportunities and the pass mark is 90%. The first test and second retest comprise a set of 10 slides with a time limit of 2 hours. The third and fourth retests comprise 20 slides with a 4-hour time limit. An individual who does not achieve a pass on the first test must be retested with a second 10-slide test within 45 days of notification of failure. Second and subsequent failures require escalating educational interventions and documented re-examination of all slides examined by that individual.

CervicalCheck Statistics

A separate workload recording form has been put in place with effect from August 2012 to segregate CervicalCheck from other workload sources. The count includes both cases which have an initial full screen or have a full screen following an FOV review. This monitoring ensures that primary screeners who participate in the delivery of the CervicalCheck contract do not exceed 6 hours of primary screening or 75 Non-FOV slides per day. To manage this requirement Quest has put in place a policy whereby screeners can only screen CervicalCheck cases during CervicalCheck designated work days. No other cytology is screened during these designated days and no CervicalCheck work is screened during non-CervicalCheck days. Group Leads may screen any work at any time.

Screening performance data are supplied to CervicalCheck on a quarterly basis via the Cyto 1 Report. Data for 2013 quarters 1, 2 and 3 were provided to the Visiting Team members in advance of the Site Visit and aggregated data for year end 2013 have been provided subsequently. The data include number of specimens received by source and overall reporting profile; reporting profiles for individual screening staff including group leaders, cytotechnologists and cytopathologists (numbers and percentages); individual screening staff sensitivity and specificity figures for ASCUS+ and for HSIL+ (see previous comments); numbers of specimens reported and screening hours by individual screeners; and participation in external Quality Assurance schemes.

Appendix D gives a comparison of the reporting profile for CervicalCheck cases reported by Quest during 2010/11 and in quarters 1-4 of 2013.

The unsatisfactory rate was recorded at 0.60% (10^{th}-25^{th} percentile, CAP 2011 ThinPrep checklist) during the 2011 Site Visit. This figure has risen during 2013 to an annual average of 0.87%, where it lies between the 25^{th}-50^{th} percentiles for CAP ThinPrep laboratories.

The 2011 Site Visit raised concerns in respect of the high rates of reporting of both ASCUS and ASCH. Since that visit the rates of both of these diagnostic categories have fallen. The ASCUS value of 9.45% recorded in 2010/11 has dropped by approximately one half and now has an average value of 4.94% which lies between the 25^{th}-50^{th} percentiles on the 2013 CAP ThinPrep checklist. The decline in ASCUS reports is likely to relate to the IRE ASCUS Review in which the work of cytotechnologists with high ASCUS rates was checked and educational sessions provided to revisit and reinforce diagnostic criteria and baselines. Pathologists were also made aware of this initiative and monthly

metrics were reviewed. Cases from cytotechnologists whose ASCUS rates are 1.5x the laboratory average are rescreened.

The ASCH value has dropped from 0.66% in 20101/11 to a current value of 0.50%. In 2010/11 a total of 1.67% of cases was reported as HSIL (P5 & P6) or possible high-grade (ASCH). This compares with a total of 1.2% during 2013. While both of these values have fallen, both remain between the 75th-90th percentiles on the 2013 CAP ThinPrep checklist. It is impossible to determine whether this fall represents a change in reporting practice or a transition from predominantly prevalent to predominantly incident round screening. PPV data are not available for 2010/11. However, the PPV of circa 85% for 2013 (verbal communication) would indicate that the majority of high-grade cytological abnormalities are confirmed histologically as CIN 2+ on biopsy. It might be interesting to separately determine the PPV of cases reported as ASCH. The Visiting Team notes that of the 5 ASCH slides provided for review during the Site Visit, 3 of the cases would have been reported as HSIL and only one was confirmed as ASCH.

The 2013 PPV confirms that the high HSIL reporting rate is justified and reflects a higher intrinsic abnormality rate within the Irish population at present when compared with the average US laboratory population. This is almost certainly related to the relatively recent rollout of population-based screening with many women in only their first or second rounds of screening.

AGC reports have fallen from 0.52% in 2010/11 to an average of 0.30% in 2013 and now lie on the 75th percentile on the 2013 CAP ThinPrep checklist (previously 90th-95th percentiles). While this reduction is welcomed, the reporting of this diagnostic grouping remains high and is of continued concern in the setting of population-based screening. See also report of the Coombe Hospital, Dublin.

Individual screening data from the Cyto I Report show substantial but not unexpected variation both in total productivity, number of screens/hour, reporting profiles, sensitivity and specificity. For example, in Q1 2013, CT 17 reported 921 cases of which 0.22% was reported as P5/P6. In contrast, CT 35 reported 728 cases with 1.92% reported as P5/P6. This variation is not unusual and is only of concern if other quality parameters are outwith expected limits.

On the basis of the data provided, none of the screening staff exceeds the agreed maximum workload limit of 75 Non-FOV slides/day, although one cytotechnologist achieves this figure. There is also variation in workload figures between cytopathologists with one unlikely to achieve the required 750 cases/year. The Visiting Team was assured that this individual does exceed the minimum workload when domestic cases are added to CervicalCheck cases.

Sensitivity data are calculated on 12-months data with 3-month periods being added/subtracted with successive quarters. The Cyto 1 Reports show significant numbers of cytotechnologists who appear to fall below required sensitivity parameters, although, as previously noted the CervicalCheck parameters are different to both CPAP and NHS CSP parameters making direct comparison difficult. The Visiting Team acknowledges that these parameters are bound in to the overall CPAP and that variance in these quality indicators would potentially lead to corrective actions.

Cytology/Histology Correlation

CLIA regulations require the comparison of HSIL (or above), adenocarcinoma or other malignant cytology cases with tissue results and a determination of the causes of any discrepancies or non-correlations. Domestic cases are correlated immediately if the laboratory receives both the cervical smear and biopsy. If the biopsy is not received then the laboratory adds a standard message to the

report requesting biopsy follow-up data. Quest is dependent on CervicalCheck to obtain tissue reports for correlation of the Irish workload. This appears to be happening with increasing ease but not all institutions are as yet fully compliant.

The Visiting Team recommends that Quest considers the introduction of individual PPVs as well as a pan-laboratory PPV. To facilitate this enhancement, individual Quest pathologists are invited to register with the CervicalCheck programme and to capture their unique ID on the result files. This would allow C CervicalCheck to include this ID on the histology spreadsheets allowing calculation and monitoring of individual pathologist PPVs.

Quality Management Programme, Quality Manual and Standard Operating Procedures (SOPs)

The Visiting Team was provided with sight of a detailed Quality Manual. Quest Diagnostics is committed to Six Sigma Quality and the principles of this system are apparent throughout the manual and in many of the SOPs. The annual Quality Management Plan is used to assess achievement against a range of goals within the Quality Manual and it was apparent from discussion that the team expected to meet most if not all of those goals.

Members of the Visiting Team suggested it would be useful to draw up a supplementary Quality Management Plan which included some of the metrics within the current QMP but incorporating metrics specific to the Irish workload. CervicalCheck would produce an initial draft for circulation and comment with a proposed go-live date in Quarters 2/3 of 2013.

An impressive array of SOPs was available both before and during the inspection for review. Most of those examined were of high quality with substantial detail of the procedures covered. All displayed evidence of annual review, signed distribution lists and date placed in document control. The Ireland Workflow SOP was found to be unusually brief and lacking in detail. The Visiting Team recommended that this document be reviewed and expanded to cover the entire pathway of the sample through pre-analytic, analytic and post-analytic processes and to integrate HR-HPV testing and reporting. Any CervicalCheck documents that are cited should be cross-referenced in the relevant section or added as appendices.

5-Year Retrospective Review / Cancer Audit

Quest undertakes a review of all negative gynaecologic cases, available on-site or in storage that were reported within 5 years of the reporting of the current HSIL+ case. This policy also includes provisions for documenting educational feedback on retrospectively reviewed cases to the cytotechnologists and to cytopathologists. The Visiting Team was provided with this documentary evidence.

During 2013 2,675 cases were reported as HSIL+, with previous negative cytology on 1,224 cases. Educational review by cytotechnologist was conducted in 222 cases and 39 cases (3.19%) were reclassified.

Reportable Quality Issues

In addition to the Ireland Non-Conformance process, the laboratory operates a Reportable Quality Issues (RQI) practice through the Quality Assurance department. While non-conformances and RQIs are in principle similar, a single non-conformance may not justify being categorised as an RQI. An RQI can relate either to a single major event or to a cluster of similar non-conformances which together constitute an RQI.

The RQI practice requires the identification of contributing causes and the formulation of a corrective action plan which is monitored by the QA department. QA reviews the effectiveness of the plan thirty days post-implementation and makes recommendations if further/additional monitoring is required.

The Visiting Team felt it would be useful if all non-conformances raised by CervicalCheck against Quest be handled in a manner similar to the RQIs with review 30 days after implementation of a corrective/preventative action plan to ensure its effectiveness. Further, any preventative action recorded by Quest as a result of a non-conformance/RQI raised by CervicalCheck should reference the CervicalCheck quality number.

Slide Evaluations

56 slides were examined during the visit; 15 ASCUS, 5 ASCH, 10 HSIL P5, 10 HSIL P6 and 10 AGC and 6 AGC (favour neoplastic). Each slide was subject to only brief review given the unavoidable time constraints and the findings must be viewed as indicative rather than absolute. Appendix D documents the outcomes of this review.

As noted in the previous Site Visit, there was good agreement for cases reported as HSIL P5 and P6. Of the 15 ASCUS cases, 7 were agreed as ASCUS with 3 recorded as NILM, 3 as LSIL and 2 as ASCH. This level of agreement is higher than that recorded at the previous visit and reflects the ASCUS percentile value which now lies between the 25th-50th percentiles on the CAP ThinPrep checklist, as compared with 90th-95th percentile in 2011. For the ASCH cases, 1 case was confirmed as ASCH, 1 was recorded as LSIL and 3 as HSIL.

AGC reporting rates were discussed in the CervicalCheck Statistics section. Of the 10 proffered AGC cases, 4 were agreed as AGC, 2 were recorded as ASCUS and 4 as NILM. This implies a continued tendency to over-report potential glandular abnormalities and has lead to some loss of confidence in the reliability of such reports amongst Irish Colposcopists.

The quality of the preparations was in general good, however, two of the slides were thickly clumped and of poor technical quality. The nuclear stain was particularly dark and in some slides compromised the assessment of crowded cell groups, including endocervical groups. The Visiting Team recommends that more emphasis is placed on the technical quality of preparations with a review of staining characteristics to determine whether this has contributed to the high AGC reporting rates. The possibility of joining a UK regional Technical EQA Scheme was also discussed although it was acknowledged that logistical constraints and the use of the Imager synthetic haematoxylin could make this difficult.

Education & Training

All cytotechnologists are required to obtain a minimum of 12 hours of continued education (CE) per calendar year, divided evenly between didactic and multi-headed microscopy sessions and including off-site and interlaboratory comparison programmes. The organisation encourages staff to attend a national or regional meeting every few years and to attend state or local meetings every other year. All cytotechnologists attend CPC conferences on a rotational basis and participate in journal based learning and on-line training.

The Visiting Team examined training records for a number of different staff grades. These included details of the job description, verification of professional qualifications and of continued professional development including both in-house and external training. A number of training events relate specifically to the Ireland Workflow SOP. All records examined were found to be satisfactory.

Newly hired cytotechnologists are initially supported by 100% rescreening of their work with a workload limit set at 100 slides per 24 hours (12.5 slides per hour). Workload and variance data are monitored using the CPAP spreadsheets and metrics calculations but variances do not instigate performance warnings at this stage. This support continues until the new employee has screened a minimum of 500 cases or until 8 consecutive SILs have been detected without any variances. Extended supervision is required if variances are identified. A reduced monitoring programme is available for various categories of transfers with the organisation.

Communication

Clinico-Pathologic Conferences (CPCs) are held for each of 3 Irish Colposcopy sites on a monthly basis via a video link. The meetings in Quest are held in a large seminar room which houses a 20-headed discussion microscope. This allows many of the Cytotechnologists to attend and be party to the discussion of interesting and discrepant cases. Approximately 20 cases are discussed each month and while notes are made of the meetings, there are no formalised minutes nor are the notes circulated. Diagnoses are rarely revised and then only if the change would affect patient management. SOPs for the issue of revised and/or amended reports are in place.

There is regular dialogue and email correspondence between Quest and CervicalCheck on a wide range issues. The Director of Anatomic Pathology has visited a number of the Irish colposcopy clinics and now knows some of the colposcopists personally.

Visit Recommendations

The Visiting Team noted many points of good and very good practice but has also identified a number of areas which require attention. These are as follows:

Immediate recommendations:

There were no immediate recommendations.

Short term recommendations:

- The chain of custody for the manual denaturation and hybridisation of HR-HPV tests is heavily reliant on specimens remaining in a pre-determined position/order. While the Visiting Team was unable to identify any specific problems and acknowledges that manual processing is only used with small test numbers, there were inherent concerns about the security of this methodology. It is expected that manual processing would cease when larger numbers of CervicalCheck cases are presented for HR-HPV testing.

- That a supplementary Quality Management Plan is devised which includes some of the metrics within the current QMP but also incorporates metrics specific to the Irish workload.

- CervicalCheck will review and amend the current Cyto1 Report to ensure that all parties calculate sensitivity using the same metrics and are therefore directly comparable. It is likely that the revised sensitivity calculations will be for ASCUS+ and HSIL+, and that the addition of ASCH and AGC (favour neoplastic) to the latter category will cease. A 90% target is likely to apply to ASCUS+ and a 95% target to HSIL+. CervicalCheck will liaise with providers to ensure they are fully informed of the changes and their proposed implementation dates.

- That Quest considers the introduction of individual PPVs as well as a pan-laboratory PPV. To facilitate this enhancement, individual Quest pathologists are invited to register with the CervicalCheck programme and to capture their unique ID on the result files. This would allow CervicalCheck to include this ID on the histology spreadsheets allowing calculation and monitoring of individual pathologist PPVs.

- That all non-conformances raised by CervicalCheck against Quest be handled in a manner similar to domestic RQIs with review 30 days after implementation of a corrective/preventative action plan to ensure its effectiveness. Further, any preventative action recorded by Quest as a result of a non-conformance/RQI raised by CervicalCheck, should reference the CervicalCheck quality number.

- That the Ireland Workflow SOP be reviewed and expanded to cover the entire pathway of the sample through pre-analytic, analytic and post-analytic processes and to integrate HR-HPV testing and reporting. Any CervicalCheck documents that are cited should be cross-referenced in the relevant section or added as appendices.

- That more emphasis is placed on the technical quality of preparations with a review of staining characteristics to determine whether this has contributed to the high AGC reporting rates. The possibility of joining a UK regional Technical EQA Scheme was also discussed although it was acknowledged that logistical constraints and the use of the Imager synthetic haematoxylin could make this difficult.

Appendices & Tables

Appendix A - Site Visit Programme

Proposed Itinerary:

Morning Session: 09:00 – 13:00 hours

- Introduction and meet with screening leads for Ireland Workload
- Tour of laboratory to include cytopathology and molecular laboratory (HR-HPV testing)
    - Review pathway of cervical screening samples
    - Workload and competency assessment within the lab
    - Amended results process
    - CPC protocols

Afternoon Session: 14:00 – 17:30 hours

- Slide review by Cytopathologist of cases as advised prior to the visit
- Review of responses and documentation provided in pre-visit questionnaire
- Additional data requests
- Q & A session

Areas of good practice during the visit will be acknowledged and recommendations for service improvements will be made. Any areas of particular concern will be indicated in order that urgent action can be taken.

Appendix B – Quest Diagnostics - Performance data Q1-4 2010, Q1 2011 & Q1-4 2013

Pattern Code	P1 Inad	P2 NAD	P3 ASC	P3b ASCH	P4 LSIL	P5 HSIL	P6 HSIL	P7 Query SCC	P8a AGC	P8b AGC favour neoplastic	P9 Query Glandular neoplasia	P10 Broken or damaged vial	Total
Q1 2010	183	31814	3447		1379	193	203	26	322		7	129	37703
Q2 2010	314	40951	4223		1638	185	228	3	405		2	249	48198
Q3 2010	338	38232	3678	51	1382	183	161	4	237	5	1	234	44506
Q4 2010	357	39865	3715	257	1549	220	225	3	243	17	3	163	46617
Total 2010	**1192**	**150862**	**15063**	**308**	**5948**	**781**	**817**	**36**	**1207**	**22**	**13**	**775**	**177024**
% for 2010	**0.67**	**85.22**	**8.51**	**0.17**	**3.36**	**0.44**	**0.46**	**0.02**	**0.68**	**0.01**	**0.01**	**0.44**	
Q1 2011	249	34595	3921	272	1672	230	191	4	200	17	5	142	41498
% for Q1 2011	**0.6**	**83.37**	**9.45**	**0.66**	**4.03**	**0.55**	**0.05**	**0.01**	**0.48**	**0.04**	**0.01**	**0.34**	
Q1 2013	337	44811	2199	194	1813	227	140	2	163	9	2	107	50004
Q2 2013	391	42779	1980	189	1718	213	158	2	141	6	2	48	47627
Q3 2013	497	45527	2811	334	2027	258	195	6	139	7	1	14	51816
Q4 2013	406	33344	2305	226	1754	221	168	3	123	8	2	37	38597
Total 2013	**1631**	**166461**	**9295**	**943**	**7312**	**919**	**661**	**13**	**566**	**30**	**7**	**206**	**188044**
% for 2013	**0.87**	**88.52**	**4.94**	**0.5**	**3.89**	**0.49**	**0.35**	**0.01**	**0.3**	**0.02**	**0.003**	**0.11**	

Appendix D – Quest Diagnostics - rapid review of archived slides

Diagnostic category	Sub-category number	Accession number	Technical quality	Review result
ASCUS	1	EC142014012	good	Negative
	2	EC142014453	good	LSIL
	3	EC142014495	good	Negative
	4	EC142014598	good	ACSUS
	5	EC142014605	good	ASCUS
	6	EC142014654	good	ASCUS
	7	EC142014902	good	LSIL
	8	EC142015006	good	ASCUS
	9	EC142015134	poor - clumped ++	ASCH
	10	EC142015141	poor - clumped +++	ASCH
	11	EC142015178	poor - thick	ASCUS
	12	EC142015351	good	ASCUS
	13	EC142013943	good	LSIL
	14	EC142013945	good	Negative
	15	EC142013952	poor	ASCUS
ASCH	1	EC142010649	good	ASCH
	2	EC142010941	good	HSIL
	3	EC142011274	good	LSIL
	4	EC142011941	good	HSIL
	5	EC142012548	good	HSIL
HSIL P5	1	EC142013774	good	HSIL P5
	2	EC142014345	good	HSIL P5
	3	EC142014650	good	LSIL
	4	EC142014666	good	HSIL P5
	5	EC142014679	scant cellularity	HSIL P5
	6	EC142015155	good	HSIL P5
	7	EC142015197	good	HSIL P5
	8	EC142012275	good	HSIL P6
	9	EC142012769	good	HSIL P5
	10	EC142012806	good	HSIL P6
HSIL P6	1	EC142009517	good	HSIL P6
	2	EC142009481	good	HSIL P6
	3	EC142009147	good	HSIL P6
	4	EC142014478	good	HSIL P6
	5	EC142013715	good	HSIL P6
	6	EC142012667	good	HSIL P6
	7	EC142012103	good	HSIL P6
	8	EC142012008	good	HSIL P6
	9	EC142011512	good	HSIL P6
	10	EC142010231	good	HSIL P6
AGC	1	EC142011050	poor – thick +++	AGC

	2	EC142011336	very dark staining	ASCUS
	3	EC142012023	poor – clumped ++	Negative
	4	EC142012370	poor – air drying	ASCUS
	5	EC142012845	very dark staining	Negative
	6	EC142009040	good	Negative
	7	EC142009206	good	AGC
	8	EC142009268	poor	AGC
	9	EC142010050	good	AGC
	10	EC142010698	poor	Negative
AGC - favour neo (fn)	1	EC142003550	good	AGC - fn
	2	EC142006183	good	AGC - fn
	3	EC142013507	very dark staining	HSIL P5
	4	EC142014306	very dark staining	HSIL P6
	5	EC142001732	good	Negative
	6	EC132183959	very dark staining	AGC - fn