

Original Article

An Analysis on Prevention Interventions: Lessons Learned

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Correspondence: Anna Wahl, BA c/o CMSS, Niels Bohrs Vej 9-10, 6700 Esbjerg, Denmark e-mail: anna.wahl@edu.fh-joanneum.at**Abstract**

Background: Infectious diseases prevention has been highly documented and applied. In the current article we analyse the intervention on chlamydia screening from a policy perspective. The National Chlamydia Screening Programme (NCSP) that was launched in the United Kingdom in 2003 serves as an example.

Objectives: This on-desk research aims to critically analyse the Chlamydia Screening Policy in the UK to point out strength and weaknesses, and to draw recommendations for improvements.

Methodology: To analyse the screening policy a selective and structured on-desk research was conducted. Systematic reviews, evaluation papers and official documents of main executive agencies as the Public Health England from the years 2000 to 2019 were included. Data were analysed by the Health Policy Triangle framework.

Results: The NCSP is an opportunistic screening programme and aims to prevent transmission, to control and to early detect the chlamydia infections in the age group of 15 to 24-year-old sexually active people. Factors that lead to the implementation were mainly politically driven, rather than based on a sophisticated analysis of sub-populations in need and a cost-effectiveness analysis. Strengths are the local embedment in primary health care which provides a low threshold approach for those in need and clear guidance for health professionals. Evaluation however is executed mainly internal and monitors more than it critically evaluates the programme on a multidimensional level.

Conclusion: Analysing the NCSP reveals lack of evidence in opportunistic screening of Chlamydia overall and the need of deeper research in terms of cost-effectiveness. A relaunch of the programme with a special focus on sub-population, the expansion of digital services and a multidimensional approach of prevention is required to legitimate the programme (e.g. Antibiotic Resistance, limited resources).

Keywords: Chlamydiae/Policy/Sexually active young adults/Great Britain/STI strategy

Introduction

Chlamydia is the most frequent reported sexually transmitted infection/disease (STI/STD) in the European Economic Area (EFA) (Van den Broek, Sfetcu & Van der Sande, 2016). The infection is caused by the bacterium *Chlamydia trachomatis*, which is transmitted by anal, vaginal and oral intercourse and from mother-to-child during birth or pregnancy. Due to its asymptomatic outburst it is hard to detect but

treatable with antibiotics. An infection raises the risk for diseases in the lower genital tract of men and women (e.g. infertility, urethral inflammations, pelvic inflammatory disease), the eye area (e.g. conjunctivitis) and risks for the new-born (e.g. pneumonia, conjunctivitis, low birth weight) (Guerra et al., 2015).

According to ECDC in 2019, 56% (n=230.482) of chlamydia cases (N=409.646) in the EFA were recorded in the UK. On EFA average 146 per

100.000 person are infected with Chlamydia. The highest proportion is in Iceland (650 per 100 000), followed by Denmark (573), Norway (478) and the United Kingdom (350). A good health data reporting system in these countries is influencing higher reported cases, compared to countries with lacking surveillance reporting systems. Due to this circumstance numbers do not map the whole burden of chlamydia infections in EFA.

Different strategies exist to prevent chlamydia infections. On behavioural level educative approaches take places. Sexual health education at school, pre- and post-test counselling or the promotion of safer sex tailored to vulnerable groups (sex workers, adolescents, people who inject drugs and men who have sex with men) are still the most common approaches in preventing STIs (WHO, 2019).

The United Kingdom (UK) with its National Chlamydia Screening Programme (NCSP) is the only country in the European Economic Area that is explicitly conducting organised screening for chlamydia. Currently a lower number of member states compared to 2012 (11/25; 44%) intend to implement an organised programme in 2017 (4/25; 16%). Evidence on the effectiveness are contradictory, that might be one reason for the decline (ECDC, 2019). The Netherlands for instance examined the implementation of a registered screening programme as a pilot project but closed it down in 2012 due to ineffectiveness based on cost-benefit analysis (Van den Broek et al., 2016).

The NCSP however is rarely evaluated. The UK reported an increase in new cases from the year 2017 to 2018. Overall 447.694 diagnoses of STIs are officially counted in the UK with a percentage of 49% Chlamydia infections (N=218.095). Furthermore, an increase of 6 per cent was observed in 2018 in comparison to 2017 (PHE, 2018). 131.269 of the Chlamydia infections are observed in the age group of 15-24 years old, which represent 60% of all registered Chlamydia infections. The higher incidence needs to be interpreted critically and can be linked to better screening methods and a higher percentage of people who go to screening as a prevention in this age group.

Based on data of the Public Health England (2018) the programme is facing new challenges

as the total number of carried out chlamydia tests have decreased by 22% since 2014. The detection rate is still lower than in 2014 (1,975 per 100,000 in 2018 compared to 2,052 in 2014) and there is still no clear evidence on the cost-effectiveness of the NCSP (PHE, 2019). At the same time the NCSP is a high achievement and needs to be analysed to adjust and learn from it.

Methodology

A case study approach is applied to examine the NCSP in the UK retrospectively. The policy is analysed based on the analytical framework of the Health Policy Triangle of Walt & Gilson's (quoted after Buse, Mays & Walt, 2005). Deriving from the policy triangle the following research questions are on focus of the research:

- What are the key objectives and regulated procedures of the policy? [Content]
- What factors may have influenced the policy? [Context]
- How did the NCSP policy get on to the agenda and how was it formulated? [Process]
- How was the policy implemented? [Process]
- Was the policy evaluated? [Process]
- Which actors influenced the policy process/content? [Actors]

A selective and structured on-desk research between September to November 2019 was administered. First a selective research was conducted by screening official policy documents about the content and epidemiology from the ECDC (European Centre for Disease Prevention and Control), the National Health Service (NHS) and Public Health England (PHE). The search terms "National Chlamydia Screening Programme" or "chlamydia AND policies OR data OR epidemiology" were used in the mentioned institutions. Reference lists in these documents were scanned to find systematic reviews, meta-analysis and evaluation of the programme.

In the second step a structured literature research was conducted on the database PubMed for a critical analysis of the NCSP. Only systematic reviews and studies on the evaluation of the NCSP were included and searched with the following search terms: "National Chlamydia Screening Programme AND UK OR Great Britain; Chlamydia Policy". Studies from 2000 to 2019 that are written in German or English were

relevant and the authors of the involved publications had to be transparent. For the general evaluation of screening programmes only systematic reviews and meta-analysis were included. Data were extracted based on a thematic analysis and needed to answer the research questions. For critical appraisal the systematic reviews were analysed by the CASP checklist Systematic Reviews (CASP, 2018). The research took place from September to December 2019.

Results

Content

The NCSP was launched in 2003 as an opportunistic screening programme with the five aims: “(1) prevent and control chlamydia through early detection and treatment of infection, (2) reduce onward transmission to sexual partners, (3) prevent the consequences of untreated infection, (4) ensure all sexually active under 25 year olds are informed about chlamydia, and have access to sexual health services that can reduce risk of infection or transmission” (PHE, 2003). The policy addresses men and woman with all sexual orientations under 25, that are or have been sexually active (PHE, 2019).

The policy regulates standard procedures as the (1) chlamydia screening delivery, (2) testing practice, (3) chlamydia screening venues, (4) providing results, (5) NCSP screening criteria, (6) management of positives, (7) offering the test, (8) treatment, (9) test consent and (10) partner management (PHE, 2018). Contents to the different fields of the screening pathway differs from the core venues where screening is conducted and are communicated by specific papers, e.g. guidance for general practitioner and pharmacies (PHE, 2014).

Additionally, the policy defines additional key performance indicators to monitor the programme:

- 95% of tested persons at one venue need to get the results within ten working days (PHE, 2018b)
- 95% of infected persons are treated within 6 working days (PHE, 2018b)
- The detection rate is set by 2.3 in 100.000 and the coverage rate of 17% in one Clinical Commissioning Groups (CCGs) area of target group population (PHE, 2014).

- 97% of infected persons are offered a partner notification discussion (PHE, 2018b).

Contextual factors

The strongest argument for the implementation of the NCSP was the increasing incidence and prevalence of chlamydia measured in 1995 in the UK. Additionally, evidence showed its “largely asymptomatic manner, relatively cheap testing opportunities and effective and convenient therapy” (Fenton & Ward, 2004).

The pathogenetic mechanism and clinical symptoms are showing that the chlamydia infections ascend over time, starting to affect the epithelium. Therefore, early detection and treatment prevents chlamydia-related diseases. This scientific factor meets the principle of Wilson, Jungner and WHO (1986) that deals with prerequisite factors for screening policies. Moreover, the immunological paradigm legitimated the screening policy as reinfections damage the tissue due to T-cell reactions (Guerra et al., 2015; ECDC, 2019). At the same time improved testing technique by nucleic acid amplification tests (NAATs) (high sensitivity and specificity) became available and an economy of scale was developed which decreased the price for testing kits (National Audit Office, 2009).

Another contextual factor was the high percentage of infection in the age group of 15 to 25-year-old people and the availability of this data. Studies concerning their sexual behaviour (e.g. change partner more frequent, use less contraceptives during sex) got available to and legitimate classification of this group as vulnerable (PHE, 2018). This data addressed the requirement of the Sexual Health and HIV Strategy in 2001 of Labour Party government to target specific groups at need (National Audit Office, 2009). As a situational factor the quite progressive policies in Public of the Labour Party since 1997 might have paved the way for the NCSP, too.

Process

Agenda setting and policy formulation

The process started with the report of rising infection rate of Chlamydia in 1995 (National Audit Office, 2019). A postulation of the Chief Medical Officer’s Expert Advisory Group followed in 1998. The group concludes after examination on the Chlamydia infections, that it

would meet the criteria of requirements (e.g. aim of early detection, acceptance of the treatment etc.) based on Wilson & Jungner (1968) to legitimate a screening program for a vulnerable groups as the young sexually active population is (Fenton & Ward, 2004; LaMontagne et al., 2004).

As a reaction the Department of Health (DoH) initiated a pilot opportunistic screening programme in Portsmouth and Wirral to examine the feasibility and acceptability of the suggested screening programme on chlamydia (La Montagne et al., 2004). In 2000 National Survey of Sexual Attitudes and Lifestyles (Natsal 2000) verified the high prevalence of infection in the younger subpopulation group due to risky sexual behaviour. Another study funded by the Department of Health were the “Chlamydia Screening Studies (ClASS) in Bristol” within the approach of partner notification and postal specimens were examined (Fenton & Ward, 2004).

Another crucial part to bring the policy on agenda was the Sexual Health and HIV strategy (2001), which supported the implementation of screening of STIs in specific target groups.

Finally, the strategy supported the planned NCSP and in 2003 the general aims, visions, standards were set by the Department of Public Health. At the same step the first GUIDANCE NCSP: PROGRAMME OVERVIEW was published (PHE, 2003).

Policy implementation

The implementation of the policy took place in three main phases from 2003 to 2008 with the main objective of embedding Chlamydia screening in the setting of primary and sexual health care services to enforce it as a regular and low threshold service to the target group (Morse, 2009). In the first subchapter the implementation on management level is illustrated and in the second subchapter the introduction on the provider level is outlined.

Management level

After the read-out of the Sexual Health and HIV strategy an implementation plan followed, which included the immediate implementation of the screening in 10 areas in UK with 300 screening points, scheduled as the first phase of the NCSP. The DoH mandated at the same time a national

Chlamydia Screening Steering Group (CSSG) with executive function of the implementation. Members of the Steering group are representatives from different types of service points (general practices, pharmacies, laboratories) included in the screening programme (LaMontagne et al., 2004; Cassell et al., 2015).

Depending on the local organisation a chlamydia screening office and coordinator is installed as well as partnerships are built with local laboratories and healthcare providers, which were regulated by contracts between NHS and different service points. Additionally, local steering groups were appointed and held responsible for reporting the screening data to the DoH as outlined in the core requirements. Scientific support for the monitoring of data has been conducted by the Health Protection Agency Communicable Surveillance Centre (CDSC) (LaMontagne et al., 2004).

The second phase took place in 2004, in which other 16 areas were integrated in the network sites of the programme. At this point 25% of all primary care trusts (PCT), which are operated since the Health and Social Care Act 2012 as clinical commissioning group, offered Chlamydia screening service (Fenton & Ward, 2004).

In the third phase, starting in 2005, the Health Protection Agency took over the support of NCSP and regional networks were set up. The third phase closed in 2008, in which the crucial monitoring indicator (Vital Sign Indicator) of a 17% coverage rate was launched to reach a higher screening rate (National Audit Office, 2009).

Provider level

The screening is offered by General Practitioners, pharmacies, eSHS (self-sampling kits ordered through the internet), genitourinary specialists and community sexual and reproductive health care service points (PHE, 2003; PHE, 2014). To reach subpopulation within the target group outreach strategies are conducted occasionally at military bases, university campuses or health fairs or mobile vans (La Montagne et al., 2004).

Every time a person of the target group is entering or contacting one of the service points, the person, independent of the attendance reason, needs to be offered a screening and handed out an

information leaflet on the procedure of the screening and the management of outcomes (LaMontagne et al., 2004). In case of a screening, clients can decide on the method they want to be informed of the result (letter, telephone call or text). People who are tested positive and not replying are contacted up to three times. In this process stage the patient is asked for the name of their partner for notification. Prophylactic treatment of the partner is also provided free of charge as part of the NCSPs' partner management programme (La Montagne, 2004).

Adaptation in terms of the specification of the service delivery were ensured by developing care pathways for specific core settings. In 2014 for instance the PHE published a document on the effectiveness of screening behavior, treatment and partner notification in pharmacies and GPS (PHE, 2014). In addition to and apart from the standard implementation steps, experts of Public Health England offer chlamydia care pathway (CCP) workshops for core venues staff (PHE, 2019).

Evaluation

A comprehensive external evaluation of the programme was executed only once in 2009 by the National Audit Office. Internal evaluation is done by Public Health England, that measures and monitors the partner notification rate, the retesting rate as well as the test result and treatment time-parameters (PHE, 2018b). As a key indicator for instance the detection rate is measured. The benchmark for detection rate is set out by 2.3 diagnoses per 100.000. However, the number varies from region to region. In the South East a stated detection rate of 1.6 is below the official recommendation compared to 2.6 in London which is much higher (PHE, 2019).

The NCSP Quality Assurance (QA) framework is another element of an on-going evaluation with the aim of analysing "event or circumstance that could have resulted, or did result, in unnecessary damage, loss or harm such as physical or mental injury to a patient, staff, visitors or members of the public" (PHE, 2014).

Considering key numbers, the National Audit Office revealed several weaknesses of the programme. The need of evaluation of the counselling quality was not met since 2009. In the National Audit report 40 per cent of young people (N=467) who were tested for chlamydia

said that they had not received advice on issues such as contraception and safer sex when tested (National Audit Office, 2009). Prerequisite for cost-effectiveness is to treat every person who is tested positive and the partner notification. The National Audit Office however analysed that still 72% of programme areas didn't meet the level of treating partners of infected subjects (National Audit Office, 2009). Another indicator that needs to be evaluated is the percentage of treated people after a positive test. In 2008/2009 there were 6,480 untreated infected individuals (National Audit Office, 2009).

Cost-effectiveness was examined only once by Adams, Turner & Edmunds (2007) with no precise evidence and many limitations. The DoH has not set any limit for the cost per QALY on average to evaluate the cost-effectiveness. The results show that only if there is a progression in pelvic inflammatory disease of 10% in infected people cost-effectiveness of the opportunistic screening would be factual (Adam, Turner & Edmunds, 2007). Measuring the effectiveness by QALY it is obvious, that it is more cost-effective to invest in detection and treatment of younger age groups than in older ones, because of their remaining life years. Adams et al. (2007) estimated the amount of one additional QALY by under 25-year women to £27,269 on average population level. This would be "in the acceptable range of £20,000-£30,000 per QALY used by the National Institute for Health and Care Excellence (NICE) and was thus considered cost-effective" (PHE, 2019).

Actors influencing policy

Over the years, experts, researchers as well as different health professionals, organised in advisory or steering groups contributed to the execution and quality improvement of the programme. Framing the political and economic legitimation the Department of Health commissioned its executive agency Public Health England and the Health Protection Agency (HPA) as a sub-agency of PHE (PHE, 2014).

Within the HPA a special NCSP project board, team and regional facilitators were appointed. The regional facilitators communicate with the commissioning clinical groups to bring the programme into action on local level. Local stakeholders as the chlamydia screening

coordinator ensures the embedment of the programme in existing structures locally.

Interest groups are influencing the policy on national level with the National Chlamydia Steering Group as well as on local level with the local Chlamydia Steering group. Individual experts from different players in the chain of delivering and providing the screening contribute with their expert knowledge, experiences and economical interest. For the practical implementation and due to the bottom up approach of the local execution, health professionals as nurses, pharmacists and practitioners are key actors to reach the target group. Patients Information Advisory Group (PIAG) was included in the process of developing information and communication structures (LaMontagne et al., 2004).

Provider of the testing kits and venues ensure to meet the demand and deliver high and relatively fast testing (Cassell et al., 2016; National Audit Office, 2009). In this context the funding of National Health Service in the NAATS (Nucleic Acid Amplification Test) technology of testing contributes to efficiency in screening. It is assumed at this point, that also the kits producer and the pharmacy industry that provides the treatment have interest to continue the programme.

Publications done especially in the journal of Sexually Transmitted Infections, owned and managed by the British Association of Sexual Health and HIV, contributed to share the national screening policy on a scientific level. As there are members in the National Advisory Group an independent report of the programme is not ensured. Other media were not explicitly identified in the research or mentioned as a push factor for the policy.

Discussion and Conclusion

The current article examined the national chlamydia screening programme in the UK as a n example of policy analysis. The infrastructure of the programme is a huge resource. Its reform and reorganisation adjusted to changing circumstances, accompanied by a multidimensional evaluation could add to the programme efficiency.

Some contextual factors are not considered could greatly benefit. For example, the percentage of all

Chlamydia infections is the highest in groups with an ethnicity background of Black African, Black Caribbean or Black other (PHE, 2018a). Cultural factors which influence the harms and benefits of the screening should be discussed to address these groups and adjust the policy. This is line with ECDC recommendations. ECDC (2019) recommends focussing on at-risk groups in terms of STI prevention. Responsible persons of Public Health England and the Health Protection Agency should have a look which marginalised groups shows high prevalence rates in diseases caused by Chlamydia or other STIs. Sub-population groups as for example migrants, Roma or groups at higher risk due to their occupational characteristics (e.g. seafarer, truck drivers, fishermen, mobile workers) should be addressed in the aims of the programme in order to develop tailored screening to their needs. For instance, seafarers and fishermen show a higher rate from infectious diseases (Kissling et al., 2005). As a part or consequence of reframing the programme to sub-populations new partners (e.g. community leaders or representatives of a group) for the screening coordination and promotion need to be integrated in the programme to reach a higher coverage rate overall. Digital testing information and management as part of an outreach strategy addresses youths in general and groups as seafarer that have limited access to on-spot health services.

On the one hand an opportunistic screening programme has limitative character as either people who are ill anyway or who care about their health more than the average population are participating (syn. “healthy screen”- effect). This fact causes a selection bias of the screened and diagnosed people. Additionally, it biases the reported number of infected people as they do not represent the average prevalence of Chlamydia in the group of 15 to 24 years old citizens in UK. Moreover, due to the existence of the NCSP a higher percentage rate in this age group goes to screening and contributes to the diagnosed cases more than people out of this target group. This might be one reason of the 61% diagnosed cases of all Chlamydia infections in the UK.

Considering that there is only one cost-effectiveness study (Adam, Turner & Edmunds, 2007) on NCSP with many limitations and only calculating the cost of one additional QALY with the women-specific pelvic inflammatory disease,

no clear statement of the value of invested money of NCSP can be made. Systematic review of Low et al. (2008) is even stating a low cost-effectiveness of opportunistic screening. In the Netherlands for example after a pilot-testing of a registered-based screening, results showed a low rate of participation and cost-ineffectiveness and the programme was closed (Van den Broek, Sfetcu & Van der Sande, 2016). In future, to evaluate the effectiveness in terms of risk reduction and costs, different RCTs and especially cohort studies need to be conducted, because many Chlamydia related diseases break out later than the infection itself (e.g. infertility, complications during pregnancy)

Summing up the evaluation of the programme do not meet the principles of Wilson, Jungner & WHO (1968), which ask for cost-effectiveness evaluation. Harms are not discussed in any of the studies of the evaluation of chlamydia screening. Low et al. (2009) and ECDC (2019) argues that there is a lack of evidence for the vulnerable group aged 14-25 for opportunistic screening in terms of effectiveness and prevention.

Due to the critical evaluation of the National Audit Office and no broad evaluation in terms of cost-effectiveness, harms and service quality ethical considerations of the programme are limited. After the report in 2009, in which “no value for money” was attested (National Audit Office, 2009), the reaction was the implementation of a Vital Sign Indicator (coverage rate of 17% in the target group of a specific CCG). In future the commissioned agencies and persons in charge need to address lack of quality and nuisances based on differentiated data analysis.

To address the most vulnerable groups local implementation and the integration of primary health care services is crucial. The network of the NCSP can be used to address challenges as the antibiotic resistance. According to WHO (2019) the issue of antibiotic resistance is highly relevant for the treatment of STIs. Due to this fact NCSP needs to facilitate more primary preventive and health promotive counselling at the service venues (e.g. education and information on STI, safer sex).

Limitation

This health policy analysis mainly includes documents of Public Health England which do

not offer necessarily independent information. Systematic Reviews were used to criticise the one-sided reporting of the PHE, that try to legitimate the NCSP. To learn more of the programme and use the structure more efficiently a new comprehensive audit and evaluation should be conducted or commissioned, as it was done in 2009 by the National Audit Office.

Place work was carried out: University of Southern Denmark, Niels Bohrs Vej 9-10, 6700 Esbjerg, Denmark

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