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# Tuberculosis care in Stockholm-

An organizational analysis based on staff perception

Author: Erik Åhlin  
Supervisor: Clas Lindberg

## Abstract

In an increasingly more interconnected world, the importance of epidemiology in public and international health is rapidly increasing. Tuberculosis is one of the diseases that contributes to this, as its lengthy incubation time and annual high mortality count makes it one of the toughest bacteria for the medical community to combat. Sweden is today a low-endemic region but still suffers a number of cases each year. The majority of these infections have occurred abroad.

This qualitative study aims evaluate the Swedish healthcare systems organizational structure in relation to the treating and tracking of tuberculosis. Key personnel from several different units working with diagnosing, treating and tracking of tuberculosis have been interviewed about their perception regarding the organizational structure. The data have been analyzed through H. Mintzbergs theoretical framework regarding organizational structure. The analysis shows that the current system can be described as an *Adhocracy*. The organization is highly capable of handling adjustment and producing unique and complex outputs in the form of individualized treatment plans and disease tracking efforts. However, the system is highly dependent on internal communication and has great difficulty in up-scaling and expanding. The study shows that the current system would be challenged by a sharp increase in tuberculosis-cases in Stockholm.

Keywords: "*Adhocracy*", "*disease tracking*", "*Swedish health-care*".

## Sammanfattning

I en alltmer sammankopplad värld så får epidemiologin en ökad betydelse i folk- och internationell hälsa. Tuberkulos är en av de sjukdomarna som ligger bakom detta. Dess långa inkubationstid och höga dödstal gör att den är en av de svåraste bakteriesjukdomarna att få bukt med. Sverige är idag ett låg-endemiskt land men drabbas ändå av ett par hundra fall per år. Majoriteten av dessa infekteras i utland och reser sedan in i Sverige.

Denna kvalitativa studie har som mål att utvärdera det svenska hälsovårdssystemet utifrån dess organisatoriska struktur. Datainsamlandet har skett via intervjuer med nyckelpersoner inom tuberkulos-vården kring deras uppfattning om den organisatoriska strukturen. Dessa har varit inblandade i att diagnostisera, behandla och smittospåra tuberkulos patienter. Denna data har sedan analyserat utifrån H.Mintzbergs teorier kring organisationsstruktur. Analysen visar att det aktuella systemet har många likheter med modellen *Adhocracy*, på så sätt att det är en organisation som kan justeras på ett mycket detaljerat och följsamt sätt i en dynamisk kontext. Den kan också producera unika och komplexa produkter i form av skräddarsydda behandlingsplaner och smittospårningar. Systemet lider dock av ett stort behov av inre kommunikation och möter svårigheter när verksamheten utökas. Slutsatsen blir att det nuvarande systemet skulle ha stora utmaningar med att hantera en markant ökning av tuberkulos fall i Stockholm.

Nyckelord: ”*Adhocracy*”, ”*smittspårning*”, ”*svensk sjukvård*”.

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## **Acronyms**

BGC-vaccine	-	Bacillus Calmette-Guèrin-vaccine. Contains a weakened form of <i>M. Bovis</i>
DOTS	-	Direct Observed Therapy Short-course
GIS	-	Geographical Information System
HIV/AIDS	-	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
KI	-	Karolinska Institutet. The Karolinska institute.
KUS	-	Karolinska Universitets Sjukhuset. Karolinska university hospital
M. Bovis.	-	Mycobacterium Bovis, a subtype of the tuberculosis-complex
PPD-test	-	Purified Protein Derivient-test.
SLSO	-	Stockholms Läns Sjukvårdsområde. Stockholm countys healthcare region
SMI	-	SmittskyddsInstitutet. The Swedish institute for disease control.
SNBHW	-	The Swedish National Board of Health and Welfare. Socialstyrelsen.
UK	-	United Kingdom
WHO	-	World Health Organisation.

# 1. Background

## 1.1 Introduction

Tuberculosis is a common disease worldwide and, while curable, can result in severe disability and death. Transmitted through aerosols, the disease can lie dormant for years only to return later in life and victims have the risk of sustaining permanent lung damage even if the disease is totally eradicated. Affected victims have a long recuperation-period and require extensive medication.

In Sweden tuberculosis is categorized as a *danger to the public, report-required and obliged for disease tracking*. This categorization is legally established in the law for disease control. (Socialstyrelsen 2009 pp25-27) Being categorized as a danger to the public means that the disease has potential to permanently harm or end human life. The law states that any such disease is obliged to be treated for free including medication and check-ups. Report-required means that doctors diagnosing the disease have to report the case to the Swedish Institute for Communicable Disease Control (SMI)<sup>1</sup>. This report must include social security number, name and probably source of infection and actions taken to cure the disease. This requirement also extends to pathologists in the case the disease is found during a autopsy (Ibid).

The Swedish National Board of Health and Welfare (SNBHW) have issued several documents including guidelines and juridical obligations relating to tuberculosis. The most extensive of these is *Tuberkulos, Vägledning för sjukvårdspersonal* (translated as: Tuberculosis, guidelines for healthcare personnel). This document handle diagnostics, treatment, medication information, rules regarding responsibility delegation and general patient interaction-recommendations. The current version was latest revised in 2009 at time of writing. (Ibid)

## 1.2 Tuberculosis

Tuberculosis is an infectious disease caused by the bacillus *mycobacterium tuberculosis*. The disease is one of the largest global infectious health threats. According to the World Health Organization (WHO) it is responsible for the second most death globally, after HIV/AIDS (WHO, 2013 p6).

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<sup>1</sup> During the course of this study, the Swedish government have restructured the agencies responsible for disease control and public health. As such the SMI have as of January the 1<sup>st</sup> 2014 been incorporated with the Swedish National Institute of Public Health into a new agency called the Public Health Agency of Sweden. This agency now resides over the responsibility to monitor the national disease control measures as well as the general public health situation. (SFS 2004:168 )

For the purpose of this study, the old term for the organization will be used as they still have the same relevant staff and mission.

It is estimated that 95% of all tuberculosis-cases are found within low- and middle-income countries (WHO 2013 p91). In 2012 the incidence rate of the disease was estimated at 8.6 million cases, with a mortality of 1.3 million (WHO, 2013 p6). Out of the total 8.6million, approximate 3 million cases were not discovered or diagnosed by national health services (WHO 2013 pp IX-X). 75% of these untreated are located to twelve nation: India, South Africa, Indonesia, Bangladesh, Pakistan, China, Mozambique, Democratic Republic of the Congo, Nigeria, the Philippines Ethiopia, and Myanmar (Ibid)

The diseases primary route of infection is through aerosols containing infected sputum from the host. When these come in contact with mucous membranes, most commonly those contained within the nose, mouth or airways, the bacillus can enter the body and bloodstream. The risk of infection depends on duration and vicinity to the infected. Spending prolonged time with the infected in unventilated areas greatly heightens the risk of infection (Lindstrand et al p168-170). A subtype of the *mycobacterium*-complex, *mycobacterium Bovis* (*M.Bovis*) is found in cattle and can be transmitted through consumption of non-pasteurized dairy products and meat. Globally the occurrence of *M. Bovis* is common, Sweden is one of the few countries that have categorized as free from *M.bovis* in cattle (Fredlund et al. 1998 p2). The majority of victims have acquired any infection of the *mycobacterium*-complex have done so abroad (Stråth 2012 pp28-30).

Once contracted, the disease can lie dormant for many years and even decades. Only about 10% of infected individuals get any type of direct symptoms. Instead most who fall ill has been carrying the disease for an extended amount of time in its dormant state (Lindstrand et al p168-170). The bacteria has a long incubation time and growth cycle, meaning that even direct outbreaks in a patient can take several weeks or months to show symptoms (Stråth 2012 pp12-14). In the case where the disease is reactivated, it is often connected to immune dampening phenomena, such as heavy stress, diabetes or malnutrition. The disease is often connected to low socio-economic standards and cramped living quarters (Stråth 2012 pp13-14). Other infections may also disturb the immune system, leading to reactivation (Lindstrand et al p168-170). A noteworthy example of this is HIV/AIDS. It is estimated that circa 300.000 of the reported 1.3 million deaths from tuberculosis were in association with HIV/AIDS (WHO, 2013 p6).

While tuberculosis can affect several organs in the body, including the joints, bones and cerebral membranes, these are rare and the vast majority of the afflicted suffer from pulmonary tuberculosis (Lindstrand et al p168-170). This is referred to as a post-primary pulmonary version of tuberculosis in medical terms but is also known as lung tuberculosis in layman terms. Symptoms are extensive and long-lasting coughing, bloody sputum, chest pains, weight loss, fever and fatigue (Ibid) (Stråth 2012 p13).

The disease can be vaccinated against with the Bacillus Calmette-Guèrin-vaccine (BGC-vaccine). The protection-rate of the BCG-vaccine is debated. Some studies put the protection rate at 50%, while others conclude that the rate of protection is closer to 85% in specific groups (Fredlund et al 1998 pp2-3). However, it does not eliminate the risk of infection entirely.

In Sweden the vaccine was part of the national public vaccination program between 1969 and 1974. The disease have since then not been considered as part of the national vaccination program but children in specific risk-groups are offered it free of charge, risk groups include children in populations migrating from a high endemic area or children who have regular contact with individuals from a high endemic area. (Fredlund et al. 1998 pp6-7).

There are several ways to diagnose the disease. Direct observation by microscopy after staining of sputum allows for quick diagnosis. It can also be diagnosed by cultivation of the bacteria, albeit the slow growth cycle of *mycobacterium tuberculosis* prolongs this process to several days. The disease can also be detected via a PPD-test, PPD standing for *pure protein derivate* extracted from the bacillus (Stråth 2012 p13).By injecting the protein into the skin of the inner lower arm and observing if a red swelling occurs diagnosis can be set. This reaction unfortunately also occur in individuals who have received the BCG-vaccine. (Lindstrand et al p169)

Once diagnosed the disease is treated with a combination of four of the following drugs: isoniazid, rifampicin, streptomycin, pyrazinamide and ethambutol, with the two first being the most important (Ibid). The patient has to take the medication for 6-8 months to destroy the infection in the majority of cases. Both the large amount of medicine and the long recuperation is enforced heavily by the medical community as disrupted medication have a high potential to cause relapses and drug resistance (Ibid).

The WHO has established a global target to stop tuberculosis within the context of the millennium development goals. These goals include limiting the mortality rate of tuberculosis by half, and lower the incidence and prevalence of the disease with 50% worldwide. Out of the six regions within the WHO, only the African and European regions aren't on track to reach the deadline of these goals in 2015 (Ibid). It should however be noted that the European region begun with a considerably lower mortality to begin with (WHO 2013 p20).

The European region has the lowest treatment rate globally with only a 72% success rate compared to the international 87% treatment success rate in 2011. The region is also estimated to have a detection rate of 74% for tuberculosis cases (WHO 2013 pp IX-XI, 142). According to a systemic review of tuberculosis treatment in Europe by Faustini, Hall & Perucci, this treatment failure can be contributed to inadequate follow-up of treated patients, which can lead to interrupted treatment and in turn additional contagion. (Faustini, Hall & Perucci 2005 pp1, 8)

### **1.3 National organizational healthcare structure**

In Sweden, the responsibility for providing health to inhabitants is delegated to the counties. These are a division of districts and each district is obliged to give fair and equal care to whole population (SFS 1982:763, 1§-2§). The care should be performed based on the patients' needs and be easily accessible. It should also provide care of high quality and deliver the care with regards to continuity and to facilitate positive relations between care receiver and provider. The patient is entitled to guaranteed treatment, including access to primary care facilities, the right to come in contact with physician within both the primary and specialized care as well as to have access to planned treatment (SFS 1982:763, 2 a§-2 c§, 3§, 3 g§). These entitlements are also applied on anyone in need of immediate and vital care who is currently residing in the area (SFS 1982:763, 4§)

The responsibility to provide some types of treatment is in turn delegated to Stockholm County Healthcare Region (SLSO). SLSO is an organization operating as a private company but is subordinate to the county. The assignment of SLSO includes primary, geriatric, rehabilitative and psychiatric care. They are responsible for facilitating primary health centers as well as child- and maternal health clinics (Ibid). In addition to this, acute and specialized care should be conducted in limited use in cooperation with the Karolinska University Hospital (KUS) (LS 0705-0544).

KUS operates in the same way as SLSO, i.e. it resembles a company in its modus operandi. Its main objective is to provide the national and regional healthcare on the county's account. This includes highly specialized care and cooperation with other healthcare actors within the county, including SLSO, other hospitals and county financed private practices (LS 1109-1170, LS 1109-1217).

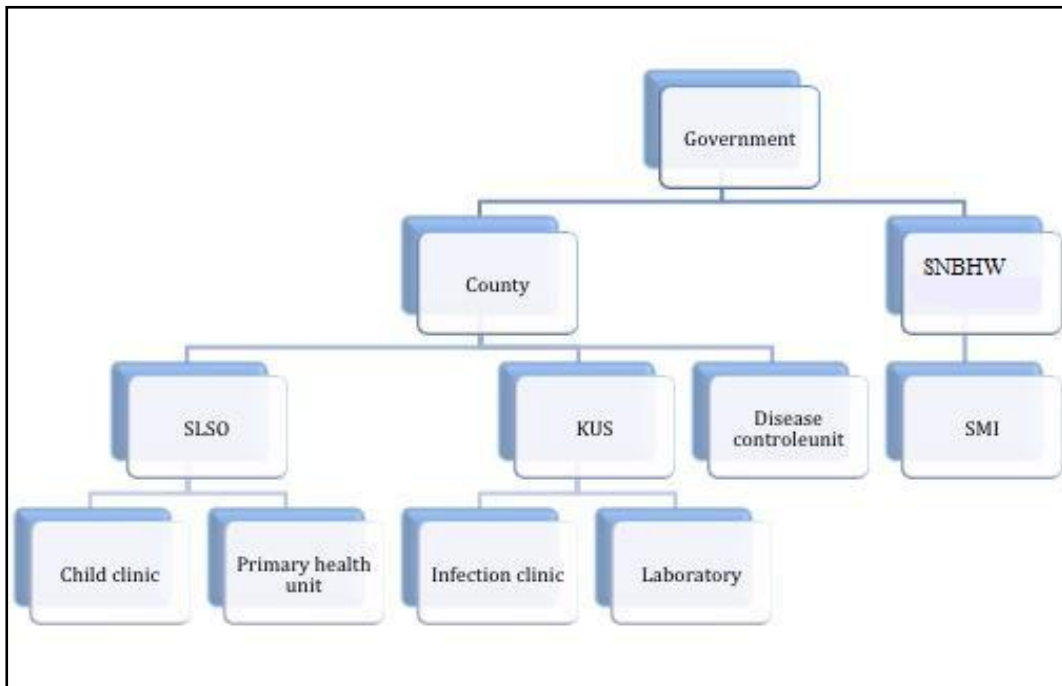
Within the KUS there are several different divisions. One category of these divisions is specialization of care delegated to different clinics. The other is the geographical division of the organizations health facilities. There are two major centers, one in the area of Solna in the northern region of Stockholm and one in Huddinge in the southern region. (Karolinska Universitetssjukhus, 2014) It is also within this organization that the bacteriological laboratory is housed, which conducts clinical testing for a multitude of pathogens, including tuberculosis (Ibid), (Socialstyrelsen 2009 pp25-27).

The county disease control unit is responsible for providing the population with necessary protection against infectious diseases. They have been delegated this task from the county. The disease control unit, primary health physicians, other relevant agencies and other health personnel should cooperate to prevent and limit disease outbreaks (SFS 2004:168, 1§, 8§). In addition to this, those involved in the disease control unit should have adequate education and experience and aspire to protect

both infected and uninfected. Infected individuals should be provided with the necessary support and treatment required from an epidemiological perspective (SFS 2004:168, 4§-6§).

The county disease control unit is in turn overseen by SMI who supervises the epidemiological situation nationally. They should also receive reports of confirmed cases of diseases that are categorized as being a danger to the public (SFS 2004:168 7§).

Based on this, the positioning and organization of healthcare in Stockholm county can be visualized as followed:



**Figure 1. An overview of the healthcare system in Stockholm county. Source: author. Data: SFS 2004:168, LS 0705-0544, LS 1109-1170, LS 1109-1217.**

The different actors within the health system have different obligation during the treatment of a patient infected with tuberculosis. These can be formed into five different instances. The treating doctor, the bacteriological laboratory, the disease control doctor, SMI and SNBHW. A lion part of the responsibility lies on the treating doctor both regarding treating and tracking the disease. The treating doctor can then request assistance from the county disease control unit (Socialstyrelsen 2009 pp25-27). A more detailed view of the division of responsibility can be seen on the following page:

## Actors

	<b>Treating Physician</b>	<b>Bacteriological Laboratory</b>	<b>Disease control doctor</b>	<b>SMD</b>	<b>National health &amp; welfare board</b>
<p><b>Deliver proper medical treatment and follow-up on the patient.</b></p>	<p>Report suspected or confirmed cases to the Swedish Institute for Communicable Disease Control (SMI) as well as a disease control doctor.</p>	<p>Contact the treating doctor within 24 hours after receiving test results.</p>	<p>Gather reports of tuberculosis-cases in the designated area.</p>	<p>Follow and analyze the epidemiological situation regarding tuberculosis to give attention of cluster formations of cases.</p>	<p>Responsible for administration of disease control is on a national level</p>
<p>Give instructions on how to minimize contagion to the patient</p>	<p>Inform SMI in the case of patient prematurely ending treatment or failing to comply to treatment-guidelines.</p>	<p>Report positive growth of Mycobacterium tuberculosis and any cases of bacterial resistance towards Isoniazid, Rifampicin, Ethambutol or Pyrazinamid.</p>	<p>Maintain supervision of the distribution of tuberculosis -cases to prevent further infection.</p>	<p>Assist in disease tracking efforts when two or more regions show cases with the same epidemiological molecular structure</p>	<p>Take the necessary steps to maintain a efficient disease control</p>
<p>Initiate disease-tracking</p>	<p>Report if the tuberculosis-diagnosis is changed or withdrawn. Inform SMI and disease control doctor if the patient dies.</p>		<p>Overtake responsibility for disease tracking in the case that the task is outside treating doctors ability.</p>	<p>Give attention to and report noteworthy changes and events related to the epidemiological situation.</p>	

Figure 2. Responsibility divided upon different actor when dealing with tuberculosis. Source: Author. Data: Socialstyrelsen 2009 pp25-27

## **2. Problem formulation**

During the last decade the incidence of tuberculosis in Sweden have increased. There are several communities within the urban population that suffers a larger amount of cases. The most afflicted area is situated within Stockholm county (Stråth 2012 pp14-17). Stockholm county is also the urban district with the most cases nationally (Ibid). There are some studies regarding the situation surrounding tuberculosis in low-endemic urban areas but none that focuses on the organizational and administrative aspects of the health care system in regards to the disease. Given this, there is a knowledge gap regarding the functionality of the disease treating and tracking structure. Interviewing the people within the health organization makes it possible to analyze the issue from a qualitative, organizational perspective.

## **3. Purpose**

The purpose of this thesis is to analyze the capacity and flexibility of the healthcare organization regarding tuberculosis from perception of selected, involved health staff in Stockholm. This has been done with a focus on organizational and administrative structure. The results presented can be used in the future as a foundation for decision makers in the creating of policy. It can also provide insight in administrative evaluation of the current organization.

## **4. Research questions**

- ⤴ How does participating health staff perceive the organizational structure involved in combating tuberculosis in Stockholm county?
- ⤴ How flexible is the organizational structure? Can it handle large influxes in tuberculosis incidence?

## **5. Scope/limitation**

This study limits itself to the national Swedish policy and strategy for detecting and treating tuberculosis. The perception of this strategy is limited to employed health personnel in Stockholm county. This is mainly due to the high concentration, in the Swedish context, of tuberculosis cases in that region. The respondents are taken from health staff that assist in the eradication and treatment of the disease. The study does not include interviews from patients with tuberculosis as the study focus is on the perception of healthcare structure by health personnel. The views of patients are not included in the study as it would highly difficult and unethical to track down infected individuals. Focusing on health personnel also limits the potential for distracting, outside factors that could affect the results.

The chronological scope of the study is the strategies and perceptions used and formed from January 2000 and until November 2013. Some guidelines and laws are older than that but are taken into account as they still are relevant within the time period.

There are no respondents from the disease control doctor, the bacteriological laboratory at neither KUS nor SNBHW because the author could not establish communications with any potential respondent there despite several efforts.

## **6.Conflicts of interest**

The author has no conflicts of interest in the result of this study.

## 7. Theoretical framework

Organizations are complex structures that incorporate a wide variety of aspects. To analyse these types of structure a certain categorization is necessary. H. Leavitt defines organizations as systems of elements that are interconnected. These elements can be formulated within four different groups. These are *Tasks*, *People*, *Technology*, and *Structures* (Leavitt 1965 pp1144-149).

According to Leavitt, all organizations have tasks or problems to perform. In the case of Stockholm regional health care, the *task* can be summed up to cure and help inhabitants with healthcare related problems, such as disease or injuries. All organizations also contain *people*, primarily employees and similar assigned individuals. These use different tools or knowledge to perform the task assigned to them, these tools and know-how is categorized as *technology*. To sum it up, the people working within the organization also have certain norms or rules that guide their interaction with others both within the company and with outsiders. These are referred to as *structures* (Ibid).

Leavitt second point is that these different categories are interconnected, often in a dynamic way. Technology can affect structures as new ways of communication can change the norms that guide interaction, new tasks allow for new people to be introduced that harbor new knowledge needed to perform said tasks. To evaluate the *structures* within an organization, one has to look at the *technologies*, *tasks* and *people* as well. An efficient organizational strategy must be in symbiosis with these aspects to perform optimally (Ibid).

### 7.1 The Adhocracy

In addition to Leavitts theory, the employment composition is also vital to understanding the structure. In the case of the combat against tuberculosis in Stockholm, several actors from different institutions and professions are involved. To approach this, the author has examined theoretical models that can fit the profile. One of those is the Mintzberg & McHughs *Matrix-structure*. While first applied to a government-owned film-making company, the model is applicable across a wide variety of organizations. The formation is preferable in areas of work that require highly specialized personnel with related but varying tasks. As such the structure is often applied in so called *Adhocracy*-organizations. This is derived from the Latin expression *Ad hoc*, translated roughly into *making things up* (Mintzberg & McHughs 1985 pp2-5).

The *Adhocracy* is a structure where the *tasks* of the organization produce complex and unique outputs. These outputs require highly educated personnel and advanced technology. These are, due to the high level of education required, specialized into several distinct roles and perform different tasks within the structure (Mintzberg & McHughs 1985 pp2-3).

For administration and practical purposes, it is efficient to house employees with the same role in collective units. This usually include that geographical clusters are created for each specialist group i.e. people with the same tasks are housed in the same department in a specific office or site.

Any adjustment within the structure is difficult to control from the top, due to the complexity of the outputs. Instead it is advantageous to allow adjustments at the different units' discretion. This creates a dynamic organization that with a higher degree of decentralization than most other types of organizations (Ibid).

The *Adhocracy* is as most efficient when the organization can be surveyed by a central leader (Mintzberg 1993 p255). If it outgrows this scale, then the dynamic relationship between the different actors will weaken as process of adjustment making becomes more complex. It cannot rely on authority alone to function. To use the words of H. Mintzberg;

*“Of all the configurations, Adhocracy shows the least reverence for classical principles of management, especially unity by command.”* (Mintzberg 1993 p255)

The Adhocracy must hire and distribute influence among professionals owning high levels of education and experience. Unity is not provided through a hierarchical chain of command but instead depends on social and intellectual cooperation. The knowledge required for this is not standardized, at least not in full. Vital parts of the expertise are connected to the local context. Acquired standardized education only forms a base, which is then built upon (Mintzberg 1993 pp254-258). This focus on the capacity and momentum of the employed does however mean that coordination becomes more difficult the larger the organization becomes (Ibid).

One part of the difficulties that surrounds up-scaling is the need to still have functioning *liaison device*. These are functions within the structure that allows information to transfer between different units and are the conduits for adjustment that extends beyond a single unit. They often exist in the form of committees, task force or integrating officers/managers (Mintzberg 1993 pp82-87). The purpose of these is to make the organization efficient in producing their unique and complex outputs. This is however time- and resource-consuming (Ibid). *Liaison devices* can also exist to allow adjustments between the organization and external forces, in particular the conditions affecting clients (Mintzberg 1993 pp165-167).

*Liaison devices* are as such both part of the *tasks* and *structure* of an Adhocracy. If the organization grows too large, the amount of time and resources required to maintain liaison devices can exceed core tasks, making the organization highly inefficient. The organization will risk failure, either

by being drowned in liaison devices or by losing their internal and external dynamics when this occurs (Mintzberg 1993 pp276-278).

## 7.2 The Machine Bureaucracy

The *Adhocracy* is often referred to as a counter-structure to the more conventional *Machine Bureaucracy* that is common within industrial consumer goods-producing organization (Mintzberg & McHughes 1985 p33).

The Machine Bureaucracy is defined as a highly hierarchical top-down structure where the main channels of communication are vertical and formal within the structure. The dialogue between different units on the same structural level is sparse. The majority of decisions are made in the top layer by one or a few individuals. Standardization and interchangeability are virtues which suits the organizational structure. It has a high need for control and division of labor into clearly defined work-roles with rigid compartmentalization, both horizontal and vertical (Mintzberg 1993 pp165-168). The Machine Bureaucracy can be visualized as a pyramid, containing many different layers with clearly defined roles. In comparison the Adhocracy is more akin to a cloud or network in its visualization (see figure no.3). However, it always has a defined top-layer. (Mintzberg & McHughes 1985 pp4, 6, 32-24) (Mintzberg 1993 p173).

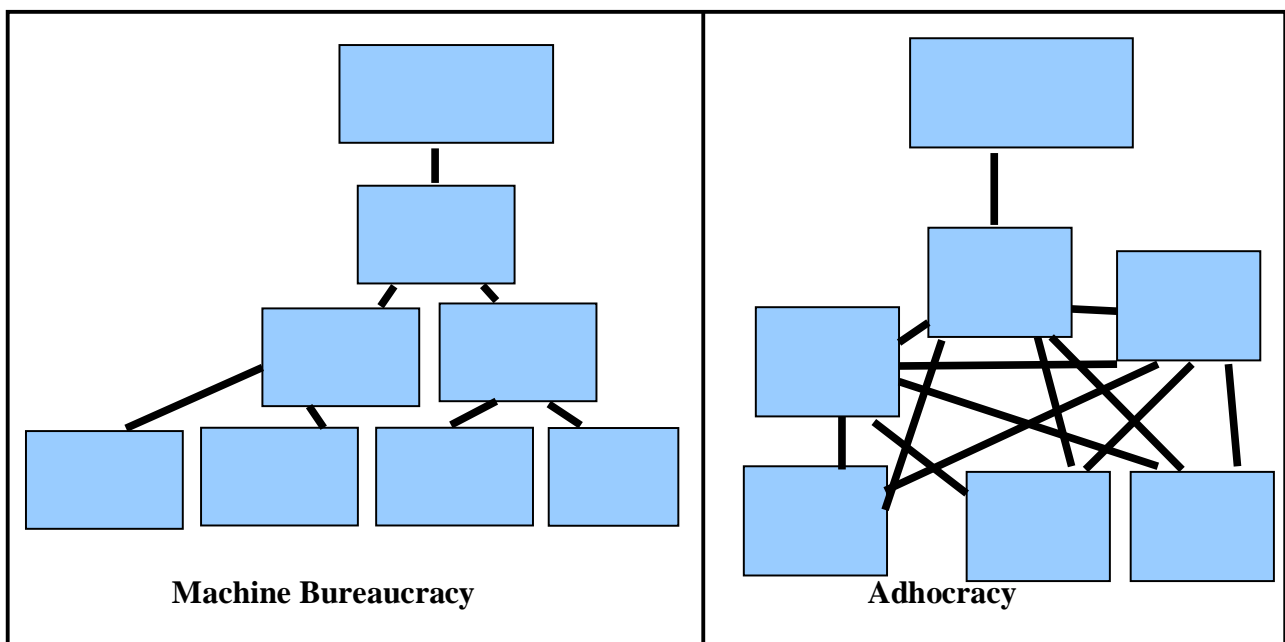


Figure 3. Main channels of formal communication within structures, Machine Bureaucracy and Adhocracy. Source: Author. Data: (Mintzberg 1993 p173).

The Machine Bureaucracy is often more efficient in large scale organizations as they do not require as much soft knowledge from employees about the individual expertise and tasks of their colleagues. Higher education should also be limited as it complicates interchangeability. The Machine Bureaucracy excels most other structures in producing standardized outputs in large scale. The rigid structure provides obvious channels of information and the division of labor creates strict work-roles containing standardized tasks that can be performed in large scale (Mintzberg 1993 pp171-178). The rigidity of the structure also makes the Machine Bureaucracy less likely to successfully handle rapid change or make fine-tuned adjustments across the board (Ibid).

### **7.3 Previous research**

There are some studies regarding treatment of tuberculosis in high-income, low-endemic settings. Bothamley et al. have studied the current treatment and tracking system in the ten most populous cities in the United Kingdom (UK). The UK has had a strong increase in tuberculosis incidence since the year 2000. The main factor to this is immigration according to the authors (Bothamley et al. 2011 pp1-7). The main obstacle for successful tuberculosis treatment and tracking was however the lack of tuberculosis nurses. Poor tuberculosis specific education toward post-graduate practitioners was also an issue. The authors point out that a significant change in efficiency occurs when the ratio of tuberculosis nurses rises to 1 per 40 notifications of active or latent tuberculosis. This mark was not reached by the health system in four of cities studied (Ibid). The authors stressed the need to reach this goal and divert resources to tuberculosis care as the incidence has risen in the region and that positive change is not plausible without these extra resources (Bothamley et al. 2011 p11). The article has been used to provide insight into a health system in a nation comparable to Sweden, allowing a international perspective.

There are other researchers who have found similar limitations in Scandinavian health systems. In their study of 2012, Sagbakken, Bjune & Frich have examined perceptions of health personnel and tuberculosis patients with Somali or Ethiopian origins in Norway regarding DOTS. This study concluded that DOTS was enforced rigidly and sometimes promoted with threats and a strong authoritarian approach. Many of the patients found the treatment-plan to be discriminating, humiliating and problematic. The health personnel had conflicting views regarding the rigidity of the method and also said that discontinuity in treatment occurred due to high workloads creating delays in the distribution of medication. There was little evidence of functioning feedback within the system (Sagbakke, Bjune & Frich 2012 pp1-11). This data formed a basis for the interview questions.

There are also two studies worth noting regarding the Swedish tuberculosis situation. In a study conducted in 2010, Kulane, Ahlberg & Berggren examines the perceptions of 34 individuals with

Somali background, regarding tuberculosis care in Stockholm. The study concluded that fear of deportation and issues with migration policies affected the interaction between the interviewed and healthcare staff. Distrust and unwillingness to share information were common themes, as well as unwillingness to participate in disease tracking-efforts (Kulane et al. 2010 pp1-6).

Trust-issues were primarily connected with interpreters, as female interpreters were considered as disloyal and gossiping by female patients. Male patients on the other hand allegedly tried to avoid interpreters in their native tongue, instead using their second language to be interpreted. As such they could avoid interpreters that could be connected to their social circuit. This avoidance was strongly connected with the heavy stigma that tuberculosis carries with the population (Ibid). Ostracism seemed to be common in cases where knowledge about a person's diagnosis got out. This stigma only covered the active pulmonary version of the disease though. There was also fear that the healthcare system would share information to other government agencies including the migration office and the police (Ibid).

The interviewed Somali did not consider latent tuberculosis a disease due to it being asymptomatic and non-contagious (Kulane et al. 2010 pp3-4). Disease tracking was compared to governmental persecution and several of the respondents expressed worries regard the use of their personal information. The article concludes that more efforts have to be made to inform patients about the disease and its treatment as well as provide a safe and trusting environment for the patient, including the insurance of patient confidentiality (Kulane et al. 2010 pp5-6). The study has been used as support in the formulation of the interview questions.

The other study relating to the situation regarding tuberculosis in Sweden is A.Stråth's thesis from 2012 which examines the spatial prevalence of TB in Stockholm county. The study analyses tuberculosis prevalence from a geographical viewpoint utilizing a Geographical Information System (GIS). It shows that a vast majority of the tuberculosis-cases in Stockholm are located to a few high density clusters. These clusters are connected to migration and areas of low socio-economic standards. The study concludes that the disease is often acquired abroad and that the majority of infected are immigrants. It also points out that immigrants often form clusters due to social and economic reasons (Stråth 2012 p5, 45-47). The national reported incidence rate has been rising during the last decade. In 2001 there were 440 cases, this have then risen forming a peak in 2010 at 683 cases. In 2011 the rate went down to 595, this is not however enough to proclaim that the trend has been changed as the rate have had erratic variations in the past. In the Stockholm region there were 143 cases in 2011. This rise is primarily connected to migration factors (Stråth 2012 pp26-28). The statistical overview has been used in the process of finding relevant respondents as well as functioned as a resource of current, statistical data.

## 8. Research design

### 8.1 Motivation of method

Given the nature of this study and the small population involved in tuberculosis diagnostics and treatment, a qualitative method is to prefer. The complexity of the subject in combination with the high potential for hidden factors encourages a dynamic method.<sup>2</sup>

Performing interviews is often time-consuming and require individual analysis, making it suitable for studies focusing on qualitative research (Bryman 2002 pp300-302). The direct contact with the respondents allows for a more dynamic approach and can be highly useful in detecting hidden factors. This is especially prominent in the case of semi-structured interviews as it can limit the interview to certain relevant themes while still being highly dynamic (Ibid).

In comparison, questionnaires and form-distribution are less time-consuming in relation to the number of respondents and generally less costly (Bryman 2009 pp147-149). As such they can be distributed to a large number of people in short time and provide large volumes of data but allow less nuance and exploration of hidden factors (Ibid). This study will therefore use semi-structured interviews as its source of respondent-data.

The study focuses on how the structures and strategies affects healthcare. The author has chosen to interview health personnel working with disease from several different units within the system. This creates a higher chance of intercepting relevant issues and strengthens the internal reliability of the study (Bryman 2008 p376). Respondents all have work related tasks connected to diagnosing, treating, tracking and/or informing patients, suspected infected or contacts to the infected. The wide variety of actors within the system allows for many different facets to be included. These individuals have responsibility for preventing, treating, protecting and informing about tuberculosis-infection in a direct way and are integrated within the Swedish health system. This allows a direct insight into the practical work and structure of the healthcare system in the field of tuberculosis.

The respondents have been chosen based on their occupation in the organizational structure to allow the study to include health staff from several of the departments within the healthcare system that have responsibility for combating tuberculosis. The selection of potential participants has been done by scanning the official web pages of the relevant units for contact information to employed personnel with connection to tuberculosis as well as through snowball sampling. Two of the respondents were found using the snow ball-technique which means that one respondent provides contact information on other relevant respondents (Bryman 2008 pp184-185).

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<sup>2</sup> The term *hidden factors* refer to information or motivations that weren't considered in the formulation of the interview questions. As such they were hidden from the eyes of the researcher during the initial phases of the research.

The selected individuals have been contacted via email with an invitation to partake in the study. The contact email included a short summary of the aim of the study, the scope and target group as well as a draft of interview questions (see Appendix A). They have been given the option to respond to this via email, phone or in a physical meeting. All of the informants wishing to participate have chosen to perform interviews at their workplace in a face-to-face meeting as the most preferable option.

## **8.2 Presentation of respondents**

The occupation and tasks that each respondent have is relevant to the study, as it identifies where within the structure they reside and what their knowledge and tasks involve. A short description will therefore be made of each participant. Their names have been changed.

Respondent A is a chief nurse at a primary family health-facility residing in Spånga-Tensta, which an area with high frequency of tuberculosis. She has tertiary education and more than a decade of experience in the facility. Her occupational tasks that are related directly to tuberculosis is arranging and distributing vaccination of the BCG-vaccine to children with the area.

Respondent B is employed with the county's disease control unit as a disease control-nurse. He has 9 years of experience in this position and before that he was a disease-control nurse at a infection clinic in Stockholm for 6 years. His occupational tasks include supervising the disease control in the county, participating in disease tracking if the need arises, providing information to suspect infected as well as assist when large scale screenings are required.

Respondent C is a nurse at an infection clinic in northern Stockholm. He has 13 years of experience at his current position and before that more than 18 years of experience as a nurse. He works full time with tuberculosis-cases. He meets patients and administers their treatment. He also initiates and conducts disease tracking. He works at a different clinic than respondent E.

Respondent D is head doctor and epidemiologist at the national disease-control center and also works as the chief doctor in a infection-clinic for two workday each week. At the national disease control center he is responsible for disease control of tuberculosis and national coordinator. He is also coordinator on a panel group focus on multiresistant tuberculosis. His tasks as doctor in the infection-clinic includes meeting, informing and testing confirmed cases, suspected cases and contacts of patients. He is a legitimate health practitioner and also a have a masters degree in epidemiology acquired in Spain. He has spent 6 years at this position.

Respondent E is a nurse at infection-clinic in southern Stockholm. She has had more than a decade's experience at her workplace. She works full-time with tuberculosis-cases, meeting patients, performing disease tracking and administers medication and treatment.

### ***8.3 Preparation and conduction of interviews***

All interviews were conducted in the respective workplace of each participant, by their own suggestion. This could affect the openness of the participants, but since it has done by their own choice, it is unlikely that it will affect the results of this study negative. Respondents A, B and C were contacted via mail and were provided with a draft of the interview questions beforehand. The interviews ranged from 14 to 66 minutes, with an estimated average of 45 minutes per interview. The interviews were conducted with a recorder to allow secondary review of the information, all the respondents were informed and approved of recording the interview in advance. Afterwards all the interviews were transcribed in full. The recordings were kept and were reviewed occasionally to make sure that the transcription was accurate. The author is the only person to have had access to the recordings and their transcription. The presence of a recorder could have affected the respondents in a way that they would moderate their answers. This has been considered during and after the interviews was conducted. There has been no apparent case where such modification has been suspected.

All respondents have been given the option of anonymity. However none have felt it necessary to be anonymous. The names of the respondent have however been changed at the request of two of the respondents.

### ***8.4 Data analysis***

The collected data has been viewed through the theoretical framework to see how the tasks, people, technology and structures are positioned and designed in relation to each other. The tasks of the respondents have been categorized to allow an overview of the different types of work. In addition to this the pathways of communication have been investigated and divided into communication between the respondents and their respective units, and communication with external actors, such as the immigration office. This allowed the data to be compared to the theories presented by Mintzberg and Leavitt and facilitate the analysis of the organizations advantages and disadvantages.

## **8.5 Ethical dimensions**

All participants have been given the option to be anonymous, since the topic of the study could include controversial views. This is accentuated as the relevant group of health personnel is very limited in number and as such respondents are easy to identify.

All respondents have been informed about the scope and applications of the study beforehand. The use of a recording during interviews have only been conducted if it has been approved by individual respondents. Any such recordings have only been available to the author and the thesis supervisor. After the study, these recordings have been erased.

## **8.6 Literature search**

To acquire a good overview of the scientific field and current situation, an extensive literature search was conducted. The search was based around three digital search engines. The search have used the following search terms alone or combined together: “Tuberculosis”, “TB”, “DOTS”, “treatment”, “Sweden”, “Stockholm”, “strategy”, “healthcare”, “low-endemic”, “organizational structure” and “health personnel”. Some of the terms have also been translated and used in Swedish, “tuberkulos”, “TBC” and “Sverige”.

One of the articles used is a review. This type of item has not the same kind of credibility as a regular peer-reviewed article, as it assembles a collection of academic pieces. This has been taken into consideration.

The published books that have been used have been acquired from academic environments and surveyed critically. This does not however make them as credible as peer-reviewed articles. This have been taken into account in the reading process.

In addition to this there are some documents and scientific reports from International NGOs (primarily WHO) and the Swedish government. The documents issued by the Swedish government have been viewed with a highly critical mindset but have been considered as necessary to provide an overview on the structure of the healthcare system. This includes organizational documents and laws regulating healthcare.

## 9. Findings

### 9.1 Working in practice

There are six nurses solely dedicated to the tasks of treating and tracking tuberculosis in Stockholm county. These are the staff that has with the most extensive contact with patients.

Individuals suspected of carrying tuberculosis are referred to the infection clinics in Huddinge or Solna. According to three of the respondents, these cases are most commonly done on referral from primary health practitioners or in acute cases, directly from an emergency ward. The patient is then tested for strains of *mycobacteria* and if positive, put on treatment. As the disease is contagious within the first two weeks of treatment, the patient is often isolated to prevent transmitting the disease. They are then scheduled for regular meetings with tuberculosis-nurses until declared cured, which respondent claimed occurred within 8 months. The prescription-plan is primarily based on medical regulation and guidelines regarding the recommended dosage of the medical substances. These more or less the same whether the patient has post-pulmonary, extra-pulmonary or latent tuberculosis. The only major exception to this being that extra-pulmonary tuberculosis requires a longer consumption of the medication, often up to a year, while latent tuberculosis usually can be cured within three months. The mortality rate for treated patients was considered extremely low.

Disease tracking is initiated and primarily conducted by the specialist tuberculosis-nurses at the two infection-clinics. This responsibility is put on them based on the regulations issued by the SNBWH. As each disease tracking-effort is molded by the social life and movements of the infected patient pre-treatment, this process can obviously vary a great deal. All the respondents involved in the disease tracking did however seem to have the same type of method-basis. This can be visualized as the patient forming a central point with circles of individuals surrounding him/her in different layers based on the amount of time spent in close proximity to the patient, in turn forming a wheel. The process then involved contacting the individuals at the core, i.e. those who have spent most time with the infected. This often included family, close friends, and/or colleagues. In the case were the efforts required either going out in the field to contact the suspected infected, contacting police or tracking of large scale populations such as scanning of potentially infected at schools, the county disease control unit could be contacted for assistance. If the patient had spent time in a hospital environment for an extended amount of time while undiagnosed, other patients in the same department would also be included in the disease tracking. If many of the individuals at the core also were infected, then the disease tracking would move outwards towards the next level of individuals that had had limited exposure to the patient. This would procedure would then be repeated until it would reach a level where no new or very few infections

would be detected. The evaluation on when to stop the process was not standardized but instead it was up to each nurse responsible for the tracking.

Given the fact that stigma is common among patients with tuberculosis, there are often cases where infected individuals refuse to give up contact-information to family or friends that are suspected to have acquired the virus. Several respondents claimed these occurrences could often be solved by informing the patient regarding the dangers of going untreated and the efficiency of the treatment. The nurse always tried to make the patient inform suspected infected contacts themselves. Respondent C also told of cases where the nurse would take steps to ensure that the tracking-effort would not lead back to the patient. This kind of deception and use of subterfuge was however rare. Normally when a patient refuses to supply contact-information, the response is to repeat the request at the next appointment and if it still is refused, to take contact with the county disease control unit for assistance. As patients often had appointment with very short intervals in the beginning of the treatment, once a week seemed to be the norm, the time between contact-information requests would not be too long. The majority of respondents pointed to the importance of inform the patient about their condition, as this was seen as a good way to encourage cooperation.

If contacted, the county disease control unit tries to persuade the patient to cooperate, sometimes by visiting the patient at home. The same procedures were followed if the patient refused to partake in treatment. In the case that the patient continued to be contagious, then police authorities could be involved. Their task would in such case primarily be to stop the risk of contagion by forcing the patient into quarantine. However, this type of happening was extremely rare. The respondents could only mention a very few cases where forced quarantine and treatment had been performed.

Concerning the general method for disease tracking, there is a difference between the two infection-clinics concerning the termination of the disease tracking effort. In one of the clinics, the decision to end a tracking effort was made solely by the responsible nurse, while at the other, the decision was taken with the council of colleagues at a reconciliation meeting each week. The reconciliation meetings were conducted by both doctors and nurses and included an individual review of each active case. The respondent at the clinic without reconciliation meetings did not know that such a method was being used.

In addition to the treatment and tracking of tuberculosis, there was also a third type of task category. This was primarily performed by the county disease control unit and can be summarized as spreading awareness about the disease. Respondent B claimed that part of their work includes informing physicians within the general health system to be aware of the symptoms for active tuberculosis. Due to the relatively few cases of the disease each year, many physicians have little experience with tuberculosis and as such fail to notice the signs initially. This could create a delay in

diagnosis and subsequent treatment. This delay was re-enforced as an issue by two other respondents as well. Particularly individuals newly arrived in Sweden or who have been on longer travels abroad should be viewed with tuberculosis in mind when suffering symptoms such as long-term coughing, fever and/or weight loss, according to the respondents.

An area with relatively high knowledge among the primary health providers regarding tuberculosis is Spånga-Tensta in the northern region of Stockholm. According to respondent A the vast majority of children in the area are considered to be within the risk-group to attain tuberculosis. This is connected to the fact that large parts of the population within the region have connections to or have migrated from high-endemic regions. Because of this heightened risk, the child clinic in the area have taken a decision to provide free, voluntary vaccination with the BCG-vaccine to all children within the area. The decision to provide vaccination to all was taken at the local level. The rate of vaccination was considered to be high with very few individuals refusing the vaccine.

The county disease control units is also responsible for informing media and suspected infected in the case of large scale outbreaks or screening of numerous individuals such as disease tracking in large workplaces. A contemporary example several respondents mentioned were the screening of a local school that currently was under way. This screening included testing more than 150 individuals for tuberculosis. In such cases the county disease unit would advise people check themselves for symptoms and facilitate the PPD-testing. This would be done in cooperation with personnel from the infection clinics. Informant D pointed out that this allowed the infection clinics to have updated knowledge regarding what information the unit provided to the media and the suspected infected.

When asked if they perceived their work as mainly dynamic or mainly rigid, all of the respondents proclaimed that was closer towards being dynamic. Some respondents did however point out that a majority of their work was based on strict guidelines, primarily connected to medical regulations and juridical limitations. However as long as those rules were abided, much of the other tasks were much less restricted to formal document, policies and the like.

## **9.2 Internal interaction**

The different units involved in the treatment, disease tracking and supervision are all highly interconnected. Given the small amount of people involved in the work to treat, track and control tuberculosis, most of the individual involved know each other by name.

There is regular contact between several of the respondent, as they have meetings on regular basis where they discuss the disease tracking effort of each tuberculosis cases individually. Respondents reported that these gatherings are necessary as they allow information sharing on a very detailed level. These meeting take place around 5-6 times a year. In addition to this, one of the infection-

clinics handling tuberculosis has a weekly meeting that summarizes the progress in each case. These are referred to as reconciliation meetings. These meeting are time consuming, but seen as necessary by relevant respondent, who feel that it would be difficult to run the treating and tracking without them.

Most of the respondent, have expressed the relation and communication with other units as good and frequent. Respondent A did not have much contact with other units but said that the little amount of communication that did occur was good and that there was no hesitation to contact each other. The individuals who primarily contacted Respondent A were the county disease control personnel. However it was explained as highly infrequent, due to the low number of cases and the fact that children rarely become infected and very seldom develop contagious, pulmonary tuberculosis.

One of the respondents said that she has little communication with other clusters than her own. These were more or less limited to infrequent contact with the county disease control unit and the biomedical laboratory.

Another respondent expressed a highly positive opinion about the communication between units, albeit this did not extend to primary healthcare facilities. Respondent C admitted that the ease of the communication was connected to the geographical position of the units, as SMIs office and the infection clinic at KI are in close proximity to each other. The good communications also extended to other clinics within KI that provides services utilized by tuberculosis patients. These included the lung-clinic and the x-ray facilities at KI. While the different clinics at KI are governed by a common hierarchy, each clinic have a large degree of autonomy and act on a level field with each other. The communication goes horizontally between the different clinics when services are required. This flat structure helped greatly when dealing with or providing services to patients on short notice. These could include X-rays, bronchoscopes or blood-tests that could be scheduled almost imitatively. One respondent also concluded that his clinic could very speedily arrange meetings between patient and doctor/nurse if there was need of it. He claimed that many patients felt no hesitation to contact the clinic in the case that they had questions or if they suffered from side-effects of the medication. Meetings could quickly be arranged if the patient so desired. This easy access was accredited to the fact that there are several nurses especially dedicated to treating and tracking tuberculosis.

This claim was however challenged by the accounts of a respondent at the other clinic, who claimed that delays occurred, sometimes up to two weeks or more. In emergent situations patients could be met earlier but with the consequences that either other tasks suffered, primarily those related to coordination and education, the other option was to limit meetings or take several patients during the same meeting.

There was a noteworthy separation between dealing with adults and children. Children were referred to the Astrid Lindgren-child hospital or child clinic B77 situated in close geographical

proximity to each infection clinic respectively. There are very few employees working with tuberculosis in children, albeit this is primarily due to the established low infections rate of children than due to any resource-issues.

### **9.3 Outside actors**

When dealing with other organizational bodies, the two main categories were other hospitals outside of Stockholm county and the Swedish immigration office. Other hospitals are quite easy to work with according to respondents B C and D. The communication is conducted via either mail or phone. Several claimed that level of communication was satisfactory, albeit that certain regulations regarding temporary social security numbers caused confusion and delays. Temporary social security numbers are issued to asylum-seekers from the immigration office. These are locked to different regions meaning that asylum-seekers are issued a new number if they move or are relocated.

The immigration office is more difficult to communicate with according to the majority. The cause of these difficulties was primarily connected to rapid relocation or deportation. The treatment of patients has been put to risk due to rapid relocation as these can occur without warning. Respondent C claimed that such events could endanger the safety of the patient as it would be difficult to inform the relevant clinic and deliver the medication in time. Another respondent said that there had occurred cases where the patient had been deported without warning and he had found out about it later when the patient called from abroad to collect information about his medication to give to his current physician. The quality of service seems also to shift much depending on the respective migration officers. There were situations where respondents highly doubted the decisions made by the migration office with regards to the availability of care and medication in the native country. There were cases where it seemed like the decision to deport was already decided no matter what medical practitioner claimed. One example that occurred multiple times during interviews was the objection to the decision from the immigration office to deport patients undergoing treatment for active pulmonary tuberculosis, as long as they aren't considered contagious. This was seen as a problem as many patients would go into hiding, which in turn would disrupt the treatment, making the patient contagious again and heightening the risk of the disease developing resistance to the medication. Efforts were made to develop a law or policy that stops the immigration office to deport patients with active treatment for tuberculosis. In Norway such a law is already in place.

There were few ways to contact the immigration office. In the cases where it occurred, there was a general sense of inefficient bureaucracy in the immigration office from several of the respondents. Personnel at the immigration office were however considered to be polite and attentive when successfully contacted.

On the national scale, SMI is responsible for the coordination. There is also collaboration between different counties disease-control units. Such as annual, national meetings where among others, nurses, administrator and doctors meet and the discuss issues. There are also international conferences specifically for tuberculosis that tuberculosis-nurses have the option to partake in. SMI also have a expert panel group of scientists and doctors regarding multiresistant tuberculosis. Respondent D is the convener of that group. This group provides advice for all clinics in Sweden which handle patients with multiresistant tuberculosis.

There are occasions in which the Swedish police force can be requested to assist in disease tracking. The police assist with apprehending and bringing a contagious individual to a clinic for tests and treatment. These occasions are very rare. The police is only contacted if voluntary efforts have failed..

Police involvement was seen as a last resort, when all else had failed and it was approached with great reluctance. When it occurs, nurses and doctors with direct contact with the patient will report the failure to comply with testing or treatment plans as a violation of the disease control law. This report will be sent to the disease control doctor who will then contact the police office. Many respondents stressed the usefulness of not having to directly contact the police, as it would strain their relationship with the patient and be a issue that could destroy trust between healthcare provider and receiver. This is brought to a head as the tuberculosis nurses and doctors directly involved in the treatment also provided medication and care to undocumented refugees.

None of the interviewed expressed any major issues with treating undocumented refugees. All individuals who carrying tuberculosis or any other disease considered a danger to the public in the disease control law receive free treatment and medication. Some of these undocumented refugees also belong to the category of patients that have gone underground after having been refused asylum.

As a majority of the patients in the care of the respondents are immigrants and that the disease reactivation is most common within the first two years in Sweden, the use of interpreters were common. Respondent D estimated that at least 50% of his patients required interpreters. These could either be employed by the hospital or acquired on a consultant basis by the health personnel. Especially the Stockholm county disease control unit utilized interpreters as consultants often in the form of phone-based services. These services does however seem to greatly vary in quality as there was some trial-and-error involved in finding interpreters that preformed satisfactory. One respondent pointed out the there is a shortage of interpreters who could handle medical terminology. While the general consensus regarding interpreters was positive, there occurred cases where the patient did not receive the correct information. This incorrect information was always rectified as soon as it was discovered.

## 10. Analysis

Much points to the conclusion that the healthcare system responsible for combating tuberculosis in Stockholm county can be categorized as a Adhocracy. Each of the respondents interviewed have been highly educated individuals with specialized, tertiary education, primarily within the occupations of physician, epidemiologist or nurse. Both respondent C and D had university education beyond tertiary. They have also had extensive work-experience with in the field practical medicine. No one had acquired their position directly after receiving their occupational legitimation. Their standardized education have been enhanced and improved with lengthy experience of the healthcare system within Stockholm county and patient reception before they acquired the position they have. This corresponds well with the type of staff that inhabits a Adhocracy. They are highly specialized both regarding the relevant fields and the specific context, in this case the situation with Stockholm countys health system.

The relevant tasks that they perform are also connected to Adhocracy organizational structure albeit with some ambiguity. Mintzberg refer to them as producing complex and unique outputs as opposed to the standardized, simple outputs of the machine bureaucracy.

In the case of this study, the respondents' tasks can be generally divided into three categories, namely **treatment**, **disease tracking** and **the distribution of information**. These can each be placed somewhere on the scale between being routine and unique as well as within the span between what can be considered as complex or simple.

When asking the respondents on how they experienced their method of work, either as dynamic or routine, the majority expressed a bias towards being dynamic, albeit with some reservation. These reservations all referred to either legal requirements or medical guidelines.

The medical treatment is standardized, utilizing the same substances for all versions of the disease whether the patient has pulmonary, extra-pulmonary or latent tuberculosis. The guidelines do change somewhat regarding the longevity of the treatment, as certain types of tuberculosis take more time to cure than others. This still falls within the area of standardized categories.

There are however aspects of the treatment that are much more dynamic, as several respondents pointed out their customization of treatment based on patient needs, including distribution of medication and scheduling of meetings, as well as handling rapid relocation. Particularly respondent Es prioritizing of urgently booked patient-meetings stand out as highly dynamic as such meetings could be performed at short notice at the cost of administrative or collaborative work.

There are also cases where the patient is involved in other healthcare instances, such as geriatric or inpatient care. In such special circumstances the distribution of medicine has been delegated according to the specific situation. While not common, the occurrence of such procedures shows that the

treatment can be adaptable when necessary. In general however, there are a few routines that take president, which speaks against an Adhocracy-influenced method.

What stands out in the treatment part is the relationship to the use of interpreters. Here a great deal of personal knowledge is required as respondents claimed that the skills of each interpreter varied highly and that to separate those performing poorly versus those performing adequate, some trial-and-error had to be applied. Respondents have to acquire this information over time, meaning that to successfully handle the treatment of patients; a certain degree of non-standardized, context-based knowledge is required.

Disease tracking was considered to be a highly dynamic process by each respondent involved. While founded on a basic structure with circular layers based on exposure, the actual method involved included highly dynamic and shifting procedures. Each disease tracking is suited to the personal life of the individual patient, making them customized, unique and complex. This correlates well with the type of task that is commonly connected to Adhocracys. The possibility of acquiring temporary reinforcement from the county disease control unit in the case of large scale tracking efforts shows that the ability to adjust to complex situations transcends the different units.

It is also noteworthy the way in which the two different infection-clinics differ when concerning the ending of a disease tracking effort. If it is correct that one of the clinics utilizes reconciliation meetings in this process while the other does not, then the different units have a high amount of self-determination. They have the possibility to handle their own working methods as a collective unit. It could also be that the differentiating approaches are a result of directions from a higher authority. There is however little that points to this conclusion elsewhere within the interviews. Instead the decision taken by respondent As clinic to vaccinate all children within the high risk area, indicates that there is a high level of autonomy for units within the health system.

Another detail that deserves attention is the fact that the respondents in the clinic without the reconciliation meeting did not know of them, this is notable as there are only a handful of employees involved in the treatment and tracking of tuberculosis. These also seem to have some level of communication both formal and informal. It is unlikely that the topic of reconciliation meetings never have been touched within this communication, as they are time and resource consuming. It does however point out both the autonomy that each unit possesses which correspond with an Adhocracy-structure and the lack of horizontal communication between units, which is more affiliated with machine bureaucracy. There is a risk that multiple units with strong autonomy create different methods between themselves. Without proper information sharing this can lead to large gaps. The Machine Bureaucracy does not suffer from this due to the systematic standardization. The above mentioned example shows a conflicting view of the structure within the system. It also shows how dependent the Adhocracy is on

liaison devices, as it points out that the information about a local liaison device was not shared through any other liaison device. Considering that this study focuses on a small number of individuals, applying the same system on a large number of employees would most likely be challenging. This would noticeably require that the liaison devices were rationalized.

The distribution of information is foremost within the domain of the county disease-control unit. The unit is in charge of evaluating the epidemiological situation primarily, but also chosen to provide assistance in disease tracking when the infect-clinic needs extra manpower to handle large scale projects, such as screening large groups of suspect cases as well as educating health practitioners and the general public about tuberculosis and its contagion-paths. They also perform this task in relation to other pathogens, so they are not limited to tuberculosis only. The county disease-control is not however obliged to assist in the treatment and tracking of the disease according to respondent B. He perceived that the county disease-control units' objective is to observe and monitor, not interfere as this would risk affecting their objectivity. The respondent also told that their unit had received critique from county disease-control units from other parts of Sweden for their assistance. This critique focused mainly on the danger of losing objectivity when assisting in the disease tracking. The fact that the county disease control unit chooses to assist when not obliged and at the potential expense of objectivity, indicates that there might be a capacity shortfall within the health system to handle large scale disease tracking-efforts.

## 11. Discussion

As the world grows more interconnected there is reason to believe that the flow of people across national borders will increase. As the majority of infected have acquired the disease abroad, migration is the largest factor to consider when predicting tuberculosis incidence in Sweden (Stråth 2012 pp28-30). As such the incidence-rate of tuberculosis could rapidly rise in the case of a quick influx of immigrants and refugees. According to WHO's predictions a third of the global population are assumed to carry latent tuberculosis, meaning that any group of immigrants could carry a number of latent tuberculosis-cases nearly regardless of geographical origin (WHO, 2013 p6).

The relevant actors in Stockholm county have a high level of expertise regarding tuberculosis. The number of involved persons within the different units allow for rapid response to change. It does not however allow the county to deal with more than a strictly limited number of tuberculosis-cases. Any large increase in incidences of tuberculosis, both active and latent cases would be challenging to adapt to. Given that most of the involved personnel have education above tertiary level, it would take significant time to educate new personnel to the same level of expertise. This is most prominent regarding the knowledge tied to the local context. This combined with the fact that many of the tasks involved in the work require local context-based knowledge to perform adequately, concludes that a rapid up-scaling of the organizational units would be difficult, as location of potential staff would be arduous. Such task would require adopting a very wide search area, from both a geographical and a ability-based perspective.

The essential constellation that the actors form, also hinders up-scaling to a certain degree. In this thesis it has been defined as sharing many similarities with the Adhocracy-structure. As all Adhocracies, the efforts of intercommunication grows more complex the larger the organization gets (Mintzberg 1993 pp276-278). This would also be the case here, as there already exist several liaison devices within the system to allow updates and adjustment, these would have to scale up or branch out to handle a growing workforce. A larger percentage of employees' time would be taken up with handling intercommunication, in turn requiring the attaining of more employees. However at the moment several of the already existing liaison devices are most likely not working at optimal efficiency as there seems to be some informational gaps between units, as in the case of reconciliation meetings.

It can therefore be concluded that the system would have a major challenge to handle a sharp increase of patients. It can also be concluded that such an increase is highly plausible. Working from the assumption that Sweden will not endanger its openness, through halting its migration or actively hinder refugees from entering the nation, there are some ways to handle this conundrum. One possibility is to change the vaccination policy and include BCG-vaccine in the national vaccination-program, as well as provide it to all immigrants. This would be probably be costly, but in return severely

limit the potential for spreading the disease. It is however doubtful if the cost-benefit analysis of such a policy change would be positive without a disproportionate increase in incidence.

Another approach could be to rearrange the healthcare system to better fit a larger patient basis. This would most likely result in a shift towards a structure closer to the machine bureaucracy, integrating standardization and simplifying the procedures for diagnosis, treatment and disease tracking. This would ease up-scaling but might result in a degradation of care quality as it would be more difficult to adjust to patient needs. This would most likely reduce the efficiency of the disease tracking.

A third alternative would be to move the diagnosing, treatment and tracking of tuberculosis to general physicians and health care staff. This might be successful, but would require that the system is simplified, standardized and not as dependent on specifically educated personnel. Such a solution could perhaps be visualized regarding the diagnosing and treatment of patients but the factors concerning disease tracking would make it highly challenging.

The issues that the health system in Stockholm struggles with have much in common with the situation in other parts of Europe. In this study it has been pointed out that other nations within western Europe also struggles with staff-issues within the area of tuberculosis care. This is most likely connected to the fact that many states in this region are considered low-endemic and that the mortality-rate for tuberculosis in the European region have been exceptionally low in comparison with other regions of the world during the last decades. It is, on the other hand, surprising that both the detection and treatment rate is still so low within the region, 72% and 74% respectively (WHO 2013 pp IX-XI, 142). The reasons behind this are not clear, but an estimated guess is that the explanation takes tuberculosis connection to migration and low socio-economic status into account. Many European nations currently suffer from economic austerity, as such the will and ability to divert resources to low-mortality diseases might fade. Especially if the primary affected population lacks economical weight.

In Stockholm, however, the health staff seems to acknowledge the factors of socio-economic status and migration, incorporating them within their patient-based perspective. There is a holistic view of the disease and those it afflicts, which supersedes routine and bureaucracy.

There seems to a strong motivation to improve the situation for patient above and beyond the health care system itself. This can be seen in the efforts to create a legal restriction to deport patients undergoing tuberculosis treatment. As such laws exist in neighboring countries; these efforts could indeed turn fruitful. Given that tuberculosis is a disease that is affected by a wide variety of variable, this type of holistic approach might be a productive approach to the current circumstances.

## 12. Conclusion

Tuberculosis is still one of the largest infectious threats to human health globally. While the vast majority of cases occur in abroad, Stockholm county is the most affected region in the context of Sweden which is considered a low-endemic region. The disease is however recognized with gravity by the Swedish state and healthcare system. The main conclusions of this study are:

- ⤴ The participating health staff seems to be generally positive to the organizational structure. Most of them find that their work is highly dynamic and allows for adjustment to patient needs and current situation. The quality of the performed work is considered high and very proficient. The capacity seems however to be somewhat strained.
- ⤴ The work can be divided into three categories, namely treatment, tracking and distribution of information. All of these include a combination of dynamic and rigid elements in their tasks. Overall the work seems to be mostly dynamic with a strong baseline of regulated routines; these routines are most prominent in the treatment-category due to medical regulations and health standards. Communication between different units in the structure seems to be efficient, with some exceptions. When dealing with outside actors more issues arise, particularly concerning the immigration office.
- ⤴ The organizational structure that surrounds the handling of tuberculosis has much in common with H. Mintzbergs theoretical construct: the Adhocracy. Based on Leavitts theory on organizational composition, it can be concluded that they both focus on producing complex and unique outputs, require highly educated personnel and advanced information sharing devices. These information sharing devices might however require some rationalising.
- ⤴ The organization is highly flexible concerning small-scale adjustment but is gravely challenged when it comes to expansion. This could result in significant problems in adapting to large influxes of tuberculosis cases. Considering that the majority of infections are acquired abroad or is connected to immigration, there is a plausible risk that the capacity of the system can be exceeded. However, the author argues that it is quite hard to envision alternatives to this system without compromising care quality.

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## **Appendix A: Interview questions**

### ***General info***

*Namn, och yrkestitel?*

*Hur lång tid har du varit på din nuvarande arbetsplats?*

*Hur kommer du i kontakt med tuberkulos i ditt arbetsliv?*

### **Samarbete mellan instanser**

*Vad är dina åsikter kring arbetet inom Stockholms landsting med tuberkulos?*

*Behandling av tuberkulos-patienter involverar ett antal olika enheter (SMI, smittskyddsläkare, etc) Hur funkar samarbetet mellan de olika instanserna?*

### ***Migrationsaspekten***

*Majoriteten som diagnostiseras med tuberkulos har ju smittats utomlands. Enligt Smittskyddsinstitutets statistisk så är många utlandsfödda. Hur påverkar detta behandlingen?*

*Finns det någon skillnad mellan utlandsfödda och svenskfödda i vårdsökarbeteendet?*

### ***Medicinering och vårdtagarnas beteende***

*Skulle du säga att metoden för att behandla tuberkulos är dynamisk eller konstant?*

*Hur ställer du dig till övervakad medicinering?*

*Finns det någon skillnad mellan män och kvinnor i vårdsökarbeteendet?*

*Tuberkulos är ju sjukdom som är starkt förknippad med socioekonomisk faktorer. Påverkar det arbetet?*

### ***Andra typer av tuberkulos inklusive Latent TB***

*Lugn-tuberkulos är ju den statistiskt vanligaste förekommande versionen av den utbrutna sjukdomen, men hur hanterar ni andra typer av tuberkulos?*

*Hur skiljer sig behandling av latent tuberkulos mot lugn-tuberkulos?*

*Finns det några alternativa kanaler för att hitta latent tuberkulos?*

### ***Smittspårning***

*Hur jobbar man med smittspårning? Vilka kanaler går man genom då?*

*Hur tycker du att smittspårningsarbetet kring tuberkulos fungerar generellt?*

## ***Feedback arbetsplats***

*Känner du att du har möjlighet att uttrycka dina åsikter kring tuberkulos arbetet?*

*Får du respons från de andra instanserna?*

*Har patienter möjlighet att komma med feedback till dig?*

*Känner du några andra som skulle kunna vara intresserade av att delta i denna studie?*