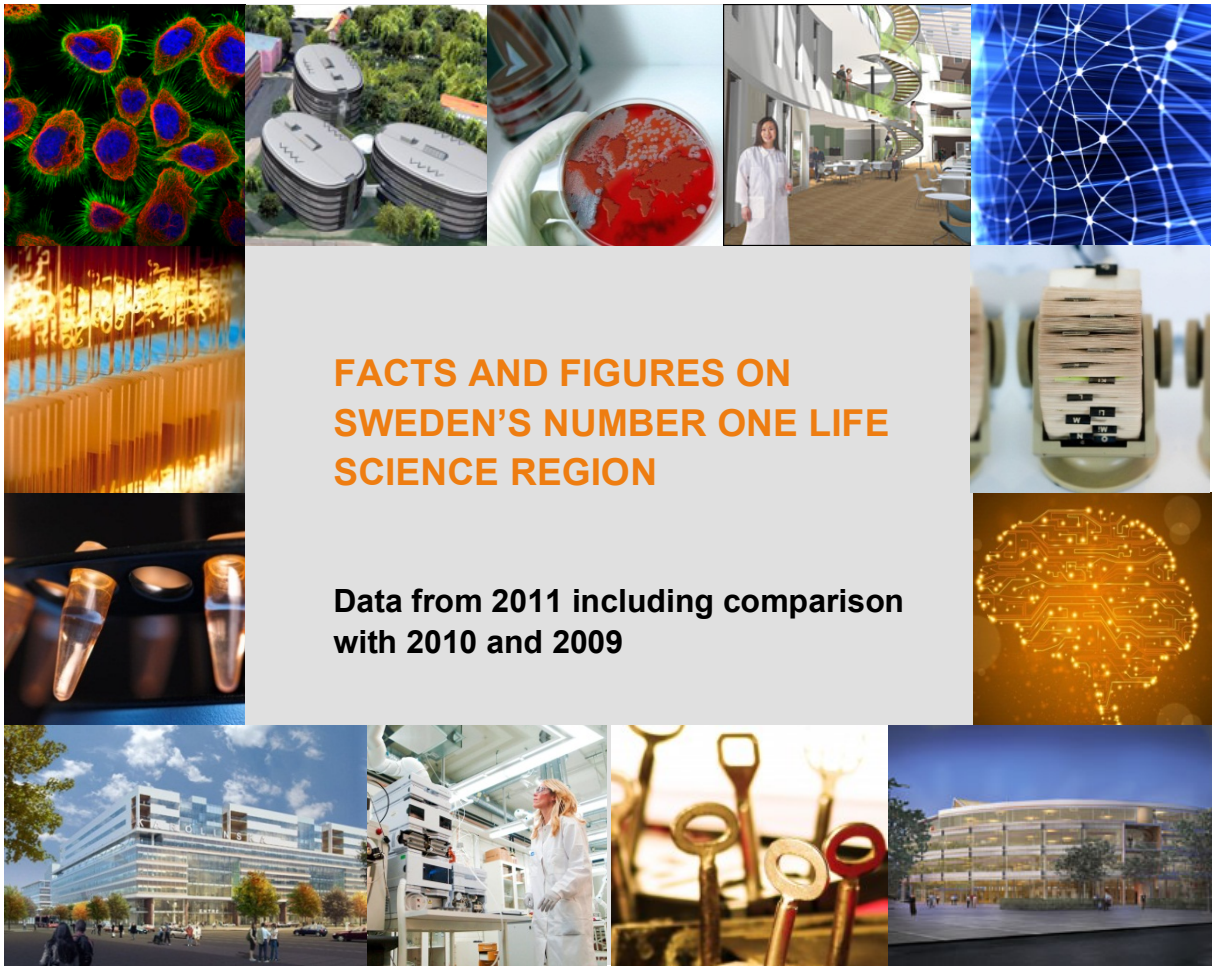


FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION

Data from 2011 including comparison with 2010 and 2009

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in October 2013

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in October 2013

Executive summary

This report is a descriptive analysis of the life science industry in the Stockholm-Uppsala region, one of the largest life science clusters in Europe, and defined as the three counties of Uppsala, Stockholm and Sörmland. Based on official sources on limited public companies (2011), the region is home to 586 companies with a total of 20,729 employees. Their combined turnover (national, not regional figure) is 141 billion SEK (~15 billion €). About 13,700 employees (66%) work for companies active in research, development and/or production, while 28% are employed by marketing & sales companies. Six percent of the work force is active in the consulting sector.

The workforce is distributed between sub-sectors as follows: Pharmaceutical 11,280 (54%), Medical technology 4,670 (23%), Biotech tools & supply 2,440 (12%), Consulting (CRO and other services) 1,200 (6%) and Diagnostics 1,030 (5%). Other biotechnology accounts for less than 1%.

There are 14 companies (2% of companies) with more than 250 employees who collectively account for over 50% of workforce. 54 companies with 51-250 employees (9% of companies) account for 27%, 144 companies with 11-50 employees accounting for 25% of the companies employ 16% of the workforce and the remaining 374 companies (64% of the company population) with 1-9 employees account for only 6% of the workforce.

AstraZeneca with 4,230 employees and GE Healthcare (1,240) are the two largest companies.

Seven of the ten largest companies have a Pharmacia heritage (the different divisions of Pharmacia were acquired or merged with other companies in the late 1990s and early 2000) in one way or another. This heritage is reflected in the different profiles of the three counties Uppsala, Stockholm and Sörmland. The most noticeable differences between the counties include a high proportion of employees in the pharmaceutical sub-sector in Stockholm (62% - of which AstraZeneca contributes 28%) and in Sörmland (94% - almost entirely due to Pfizer's biopharmaceutical production facility) while the relative contribution from Biotech tools & supply and Diagnostics sub-sectors to the work force in Uppsala is higher than those in the other two counties.

Although the net development of total work force was negative from 2009 to 2011, a number of companies in all sub-sectors grew in number of employees suggesting that at least a proportion of the individuals losing their jobs were employed by another company and that the competence pool stayed in the region to a large extent. Two groups of companies showed consistent growth from 2009 to 2011; namely companies belonging to the company size category 11-50 employees and companies engaged in R&D and/or production activities within the Biotech tools & supply sub-sector.

Reflecting global trends, there has been a continuous decline in employment particularly in the pharmaceutical sub-sector. However, there are a number of factors supporting forecasts of a turnaround for the industry in coming years (from 2012). In addition to the growth seen in a couple of sub-groups (see previous paragraph), these include the strong science base and research infrastructure already existing, a competence pool covering all fields of life science and a productive eco system for innovation. Furthermore, ambitious future plans backed by all stakeholders are underway, including major public-private investments in research funding, research and physical infrastructure totaling over 60 billion SEK (7 billion €). These investments aim at supporting not only existing companies, but also stimulating a new generation and thus ensuring that the region remains a truly global life sciences cluster.

Table of Contents

Executive summary 3

The report 5

Introduction 5

Results 8

NUMBER OF COMPANIES, NUMBER OF EMPLOYEES AND TURNOVER 8

THE WORK FORCE 2011 10

SMALL, MEDIUM AND LARGE COMPANIES 2011 12

THE LARGEST COMPANIES – NUMBER OF EMPLOYEES 2011 13

THE INDUSTRY AND ITS SUB-SECTORS 2011 14

WORKFORCE - DEVELOPMENT FROM 2009 TO 2011 BY SUBSECTOR 15

DYNAMICS IN CHANGES OF WORKFORCE FROM 2009 TO 2011 16

WORKFORCE - DEVELOPMENT FROM 2009 TO 2011 BY COMPANY SIZE CLASS 17

SUB-SECTORS AT THE DIFFERENT GEOGRAPHIC LOCATIONS 2010 18

CHANGES IN NUMBER OF EMPLOYEES FROM 2009 TO 2011 IN STOCKHOLM AND UPPSALA COUNTIES 20

Methods 22

Creating the dataset 22

APPENDIX 1 27

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in October 2013

The report[1]

The purpose of this report is to provide a descriptive analysis of the life science industry in Stockholm-Uppsala 2011 with respect to number of employees and turnover, by sub-sector and size categories. The report also includes comparative figures between 2009 and 2010.

Introduction

The global life science industry is undergoing major changes and tens of thousands of jobs have disappeared from the sector from 2000 to 2011[2]. A recent report analysing the global development from 2007 to 2012 among the largest Big Pharma companies shows that the workforce at these companies continues to decline (by 4% between 2007 and 2012), although, as a group, the decline in the workforce in recent years has tapered off[3]. According to the report, AstraZeneca, with its strong presence in the Stockholm-Uppsala region, stands out as the company that has continued to downsize its operations most, resulting in 16,000 lost jobs between 2007 and 2012. In line with these data, VINNOVA[4], Sweden's Innovation Agency recently reported that following a period of gradual growth from 1997 until about 2005-2007, the number of employees in the life science sector has dropped, largely attributed to a stepwise downsizing of AstraZeneca's workforce.

Since AstraZeneca also announced that 1,200 employees at the Södertälje site (part of the Stockholm-Uppsala region) were to lose their jobs, we should expect a further drop in workforce in the coming 1-2 years.

St Jude Medical is another global (Medtech) company which has decided to markedly downsize its operations in the Stockholm-Uppsala region. In 2011 St. Jude Medical announced that its research and development unit, as well as its manufacture of pacemakers, a Swedish invention dating from 1958, was to be closed. Since their downsizing was not reflected in official statistics 2011, this is expected to also affect future workforce developments adversely.

As mentioned already, the sector is undergoing a major restructuring in response to a number of serious challenges. These include expiration of patents, competition from generic products, increasing development costs and decreasing R&D productivity[2,5], cost and payer pressure, uncertain policy, unclear regulatory and re-imbursement environments, a different funding climate and changing customer base[6].

However, these changes also bring new opportunities. New technologies including genomics, proteomics, recombinant DNA technologies and high throughput screening have been important drivers for how pharma companies have re-focused their product development strategies. Another major trend has been to increasingly fill pipelines with projects developed by smaller drug development companies and to explore new ways of collaborating with other companies and academia. There are also several examples of open innovation models such as the Innovative Medicines Initiative (IMI), a joint undertaking between the European Union and the pharmaceutical industry association EFPIA, whereby public and private funds co-finance the early, pre-commercial stages of drug development[7,8,9]. The Stockholm-Uppsala region has been active in this arena in recent

[1] This report has been compiled in collaboration between Stockholm-Uppsala Life Science, Uppsala BIO and Stockholm Science City.
[2] http://www.forbes.com/sites/matthewherper/2011/04/13/a-decade-in-drug-industry-layoffs/
[3] http://www.epvantage.com/Universal/View.aspx?type=Story&id=447584&isEPVantage=yes
[4] Svensk life science industri efter AstraZenecas nedskärningar, VINNOVA 2012
[5] http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2011_12_09/caredit.a1100136
[6] Pulse of the industry. Medical technology report 2011, Earnst & Young. http://www.ey.com/GL/en/Industries/Life-Sciences/Pulse--medical-technology-report-2012---Industry-performance---medtechdata
[7] http://www.imi.europa.eu/
[8] http://www.broadinstitute.org/

years. Examples include the development of the Human Protein Atlas[10], the BIO-X® program[11] and AIMday[12], a structured process for creating constructive discussions around potential collaboration between industry and academic groups.

In an increasingly competitive environment, the ability to innovate is a common success factor for the entire life science industry, irrespective of subsector. Building on Sweden's existing reputation as a leader in in innovation[13], academic groups and companies in Stockholm-Uppsala (and Sweden) are well positioned to continue their engagement in collaborative innovation on a global scale.

With the ongoing transformation of the industry, the Stockholm-Uppsala region (and Sweden) face the same challenges as many other regions and countries in the world – namely how to adapt and respond to the ongoing changes in the industry in a fiercely competitive and increasingly globalised environment. As described below, a roadmap for the Stockholm-Uppsala region (and Sweden) could include building on the region's innovative capabilities within several sub-sectors of the business including protein science, molecular diagnostics, drug development and medtech – and backed by substantial investments in research infrastructure. Another strength becoming increasingly apparent is the region's ability to manufacture and distribute internationally high quality, cost-effective products meeting the strictest environmental standards from several production facilities.

Despite the recent decline in the life science industry in Stockholm-Uppsala, there are a number of factors supporting forecasts of a turnaround for the industry in coming years. Firstly, we see promising growth in several young, innovative, companies. There are also several manufacturing companies in the region, all of them among the larger companies. Some of them are showing organic growth. Furthermore, the region is home to an already existing science base with internationally competitive research in several fields, translational research at university hospitals, an eco system for innovation including support functions with expertise and vast experience in building companies. The region is also blessed with a strong research infrastructure, including the latest platforms for biomedical research, biobanks and patient registries and complementary fields such as a leading information and communication technology cluster.

Ambitious future plans are underway integrating major investments in research infrastructure, physical infrastructure and research funding. The aim is that these investments will further strengthen the region's capacity for knowledge creation and innovation, thereby creating even better conditions for companies to be competitive on the global market.

Below is a selection of the most important of such ongoing and planned projects and investments for the next 10 years, much of which illustrates a clear direction from both national and regional/local politicians to invest in life science,.

Investment in research and research infrastructure

- **Protein science** – the region has a strong tradition of leadership in protein science and is also home to GE Healthcare's global research headquarters for protein analysis and separation. In 2015, the Protein Atlas project, aiming at mapping all 20,000 human proteins, is expected to be finished.
- **SciLifeLab** - with two sites, in Stockholm and Uppsala represents an unprecedented national research infrastructure. (In 2012, SciLifeLab received the largest ever investment in life sciences by the Swedish government), focusing on genetics, molecular bioscience and protein science. This national life science research institute, a collaborative venture between

[9] www.mmv.org
[10] http://www.proteinatlas.org/about/introduction
[11] http://uppsalabio.com/DynPage.aspx?id=98999&mpath=7400
[12] http://aimday.se/about-aimday/
[13] http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/index_en.htm

Karolinska Institutet, Royal Institute of Technology, Stockholm University and Uppsala University, is expected to grow to 1,000 scientists in the next few years.
- Further investments in **biobanks, patient registries** and **centres of excellence** are also under way.

Investment in physical infrastructure

- The creation of a new city section of Stockholm, **Hagastaden (2010-2020)**, a world-leading arena for life science, with **a new university hospital (to be inaugurated in 2016-2017),** expansion of **Karolinska Institutet Science Park (2013)** and **new research facilities (2018).**
- Expansion of **SciLifeLab (2013)** in Uppsala.
- Uppsala – **Skandion Clinic (2014)**, a new facility for proton cancer therapy
- **A new building for veterinary and animal science (2014)** at Swedish Agricultural University.
- Expansion of/new building at **Uppsala University Hospital (2013)**

Support structures for innovation support and open innovation initiatives

- **Innovation Akademiska** (within Uppsala University Hospital) and **SLL Innovation** (serving several hospitals in Stockholm, including Karolinska University Hospital). Both initiatives involve facilitating entrepreneurship and innovation among hospital staff and opening clinical environments as a test bed for industry.
- **Uppsala Innovation Centre** (UIC), an incubator providing financial assistance and access to commercial and technical networks; the business incubator **STING** offers early funding as well as support from industrially experienced business coaches and **Karolinska Institutet Innovations** working in close connection with Karolinska Institutet to help researchers further develop the commercial potential of their research.
- **The BIO-X®** program run by Uppsala BIO provides a structured process and support to develop academic research results into life science innovations in response to defined needs in healthcare and industry.
- **AIMday®**, a structured process for creating constructive discussions towards potential collaboration between industry and academic groups.

Additional support services and initiatives in *Stockholm Life*, the common trademark for life science in Stockholm, are provided by Stockholm Science City and Flemingsberg Science**.** More details can also be found at www.suls.se.

Results

NUMBER OF COMPANIES, NUMBER OF EMPLOYEES AND TURNOVER

This report is the third annual report on number of employees and turnover, by sub-sector as well as by company size class, comparing figures from 2009-2011[14].

As shown in *Table 1*, the Stockholm-Uppsala region has 586 life science companies with at least one employee, together accounting for 20,729 employees. This equals about half of Sweden's workforce within life science. The number of companies has declined by 3-4 % per annum during 2009-2011 and the number of employees has dropped by 702 persons from 2010 to 2009 (-3,1%) and by a further 916 to 2011 (-4,2%).

The total turnover 2011 amounts to 141 billion SEK. This is a national figure and not a figure for the region since it also covers activities in some of the larger life science companies such as AstraZeneca and GE Healthcare which have multiple Swedish sites. Turnover (national figures) have dropped year on year by about 2% from 2009 to 2010 and by 5% from 2010 to 2011.

Table 1: Number of companies, number of employees and turnover

	2009	2010	2011
Number of companies[15]	**627**	**610**	**586**
		-2,7%	***-3,9%***
Companies going from zero ≥ one employee	*-*	*9*	*10*
Change from ≥1 employee to zero employees	*-*	*-26*	*-34*
Net change from previous year		***-17***	***-24***
		-2,7%	***-3,9%***
Employed	**22 347**	**21 645**	**20 729**
Change from previous year		***-702***	***-916***
		-3,1%	***-4,2%***
Turnover (tSEK)	**152 167 360**	**149 334 800**	**141 474 831**
Change from previous year		***-2 832 560***	***-7 859 969***
		-1,9%	***-5,3%***
(Additional) turnover in 240 companies with zero employees			***631 088***

240 companies with zero employees contributed an additional turnover accounting for less than 0,5% of total turnover.

[14]The first report of this kind based on 2009 figures was published in the autumn of 2010. We have since then further developed our methodology. The most important steps have been to harmonize our data with data collected and analysed by VINNOVA, Sweden's Innovation Agency, to apply somewhat stricter critera for selection of companies and to fine tune the categorization of companies. For details, se Methods.
[15] Only limited companies with at least one employee and meeting certain critera (see methods) are included.

An additional 118 companies which did not meet the critera to be included in this report, but which are considered to belong to the life science sector by VINNOVA, collectively employ an additional 1 322 individuals. The turnover in these companies amounts to about 5,5 billion SEK.

There is also a population of companies (n=12) in the region which engage in life science-related activities, but these are not part of their core business. Their number of employees and turnover in 2011 amounted to 476 employees and about 5 billion SEK, respectively.

The geographic location of the companies included in this report are displayed on the *Life Science Industry map of Stockholm Uppsala* which is available at http://geokodning.ssci.se/.

THE WORK FORCE 2011

Research, development and/or production vs. marketing & sales

Two thirds of the employees (13,700) work in a company engaged in research, development and/or production[16] while 28% (5,800) are employed by companies focusing on marketing & sales[15] (*Figure 1*). About 1,200 experts are engaged in the Consultancy sector, thus accounting for about 6% of the workforce.

Work force by sub sector

Figure 1 also depicts how the competence pool is distributed between sub-sectors.

Pharmaceutical companies
This sub-sector represents about 11,280 employees of which just over 8,300 (72%) are employed by companies engaged in R&D. AstraZeneca dominates with its 4,200 employees.

Medical technology companies
The second largest sub-sector is medical technology with a total of 4 670 employees. Almost 60% are engaged in companies with R&D and/or production activities.

Biotech tools and supply
This sector employs just over 2,440 of which GE Healthcare accounts for about half of the workforce. One third of employees belong to companies with R&D and/or production activities.

Diagnostics
Diagnostic companies employ about 1,030 persons of whom 80% work in companies carrying out R&D and/or production.

CRO and service
Contract research organisations (CRO) and other service providers with special expertise in product development[17] account for 1210 employees. Both these categories are characterised by a large proportion of small companies employing less than 10 persons.

Other biotechnology
This sub-sector is very small with just over 90 employees.

[16] Some companies designated as research, development and/or production companies in this report also cover marketing & sales. Similarly, some M&S companies are active in clinical research but are designated as M&S companies. For these companies, it has not been possible to distinguish between the two types of activities.
[17] We do not include legal companies, patent attorneys, general business consultants etc.

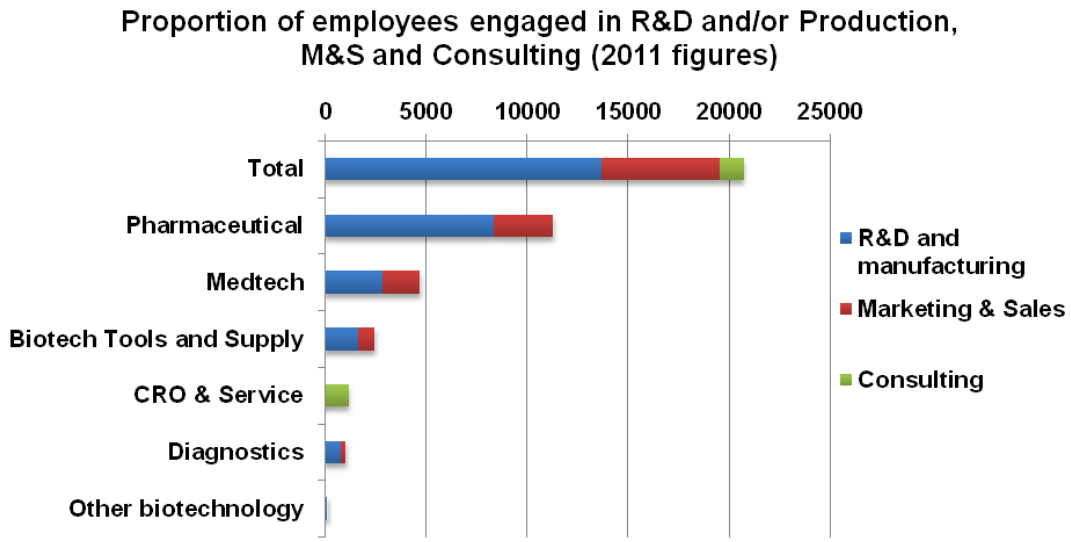


Figure 1: This figure illustrates the proportion of people employed by companies engaged in Research & Development and/or Production activities, Marketing & Sales activities and Consultancy work, respectively. Data is presented by sub-sector.

SMALL, MEDIUM AND LARGE COMPANIES 2011

In the Stockholm-Uppsala region, 64 % of the life science companies have between one and ten employees, 25% have between 11 and 50 employees, 9% have between 51 and 250 employees and about 2 % have more than 250 employees (*Figure 2*, left bar).

Half of the region's employees work in a company with a work force of at least 250 people. Companies employing between 51 and 250 persons account for 27% of the workforce and companies employing between 11 and 50 persons account for 16%. Only 6% of employees work in a company with 1-10 employees (*Figure 2*, right bar).

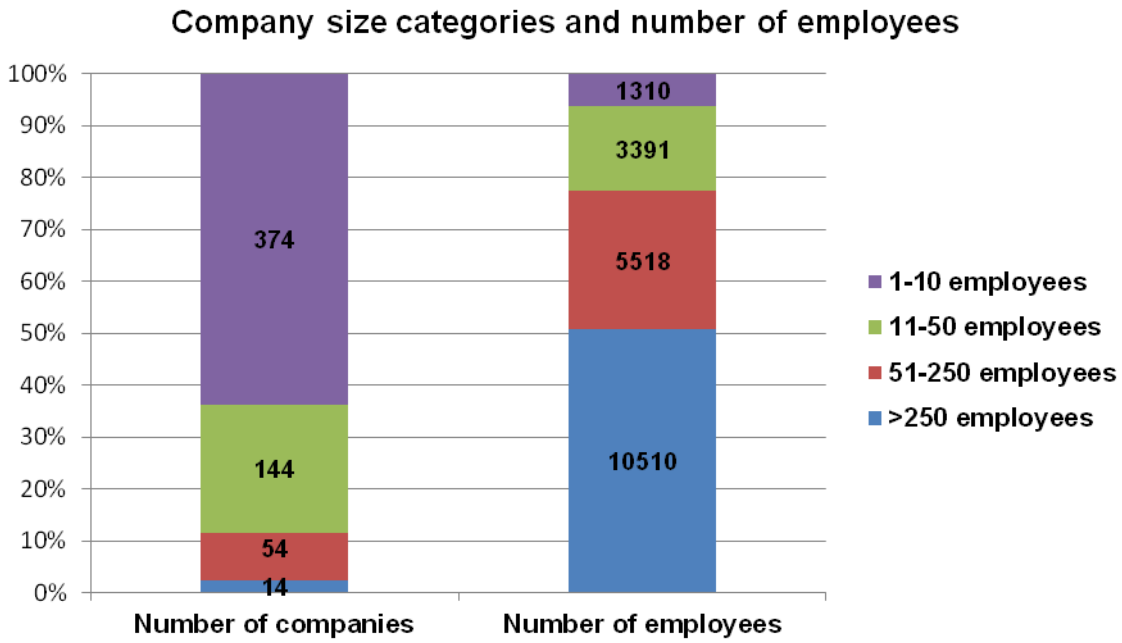


Figure 2: Number of companies vs. employees by size classes.

Company size classes and turnover[18]

The relationship between company sizes and turnover is, as expected, similar to that between company size and number of employees (data not shown). The 14 largest companies account for 51% av total turnover, the 51-250 size class for 33% and the 11-50 size class acounts for 11% of total turnover. The contribution from micro-companies (1-10 employees) is minimal (less than 3%) .

[18] Turnover numbers are national figures.

THE LARGEST COMPANIES – NUMBER OF EMPLOYEES 2011

Companies engaged in R&D and/or Production

In the region, the 10 largest companies by work force account for about half of employees as well as turnover for the industry (*Table 2*). 7 of the companies have a heritage from Pharmacia and/or Kabi (merged with Pharmacia in the early 90s) in one way or another.

Table 2: The 10 largest companies based on size of the workforce.

Company	Subsector	Number of employees 2011	Turnover 2011 (billion SEK)
AstraZeneca	Pharmaceutical	4 232	46,2
* GE Healthcare Biosciences	Biotech tools & supply	1 242	7,3
* Fresenius Kabi	Pharmaceutical	950	2,8
St. Jude Medical[19]	Medtech	785	3,0
* Octapharma	Pharmaceutical	570	0,9
* Pfizer[19]	Pharmaceutical	570	7,5
* Swedish Orphan Biovitrum[19]	Pharmaceutical	436	1,9
* Phadia	Diagnostics	422	2,1
* Recipharm[19]	Pharmaceutical	404	0,5
Maquet Critical Care	Medtech	376	1,5
Total		**9 987**	**73,9**
Proportion of entire company population		**48%**	**52%**

** companies with a heritage from Pharmacia and or Kabi.*

[19] These companies have two or more legal entities in the region. The total number of employees in these related companies are presented.

THE INDUSTRY AND ITS SUB-SECTORS 2011

Number of employees per sub sector

Employment in pharmaceutical companies accounts for more than half (54%) of the work force, of which AstraZeneca's contribition is substantial. Medical technology accounts for 23% and biotech tools and supply for 12%. CRO & Service contribute 6% and Diagnostics 5%. Other biotechnology (environmental, agricultural and food-related combined) accounts for less than 1% (*Figure 3*).

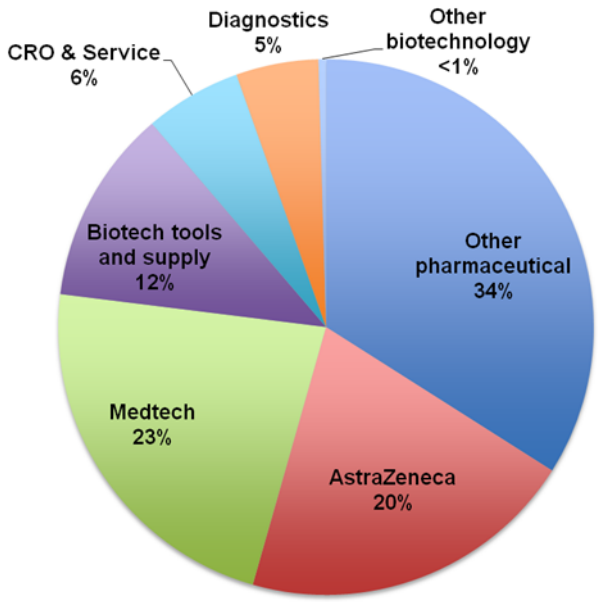


Figure 3: Distribution of work force by subsector. AstraZeneca is presented separately due to its relative size.

WORKFORCE - DEVELOPMENT FROM 2009 TO 2011 BY SUBSECTOR

As much as 91% of the decline in the total number of employees is accounted for by changes in the pharmaceutical sub-sectors. About 75% of this decrease is attributed to companies engaged in R&D and/or Production. AstraZeneca accounts for as much as 82% of the decline in the Pharmaceutical R&D and/or Production sub-sector from 2009 to 2011 (*Table 3* and *Figure 4* below).

Medtech R&D and/or Production companies exhibited a 5 % decline between 2009 and 2010 with no further change from 2010 to 2011. Medtech M&S went up during 2010 and then fell back again to a similar level as that in 2009. The workforce within Biotech Tools and Supply R&D and/or Production increased slightly during 2009-2011 while Biotech Tools & Supply M&S showed a continous decrease by 3-5% annually. Diagnostics R&D and/or Production companies showed a decrease from year to year by 2-3% annually while the corresponding M&S sub-sector remained essentially unchanged.

The number of employees within CRO and other service declined from 2010 to 2011 by about 4%. The workforce within Other Biotechnology showed only small changes during the three years of study

Table 3: Change in workforce by sub-sector 2009-2011. For graphical representation, see APPENDIX.

Subsector	2009	2010	2011	2010 vs. 2009	2011 vs. 2010	2011 vs. 2009
Pharmaceutical R&D and/or Production	9261	8806	8340	-455	-466	-921
Pharmaceutical M&S	3349	3172	2940	-177	-232	-409
Medtech R&D and/or Production	3017	2850	2852	-167	2	-165
Medtech M&S	1836	1959	1822	123	-137	-14
Biotech Tools R&D and/or Production	1570	1603	1619	33	16	49
Biotech Tools & Supply M&S	903	856	820	-47	-36	-83
Diagnostics R&D and/or Production	829	809	795	-20	-14	-34
Diagnostics M&S	233	232	238	-1	6	5
CRO and other service	1256	1261	1209	5	-52	-47
Other Biotechnology	93	97	94	4	-3	1
Total	22347	21645	20729	-702	-916	-1618

.

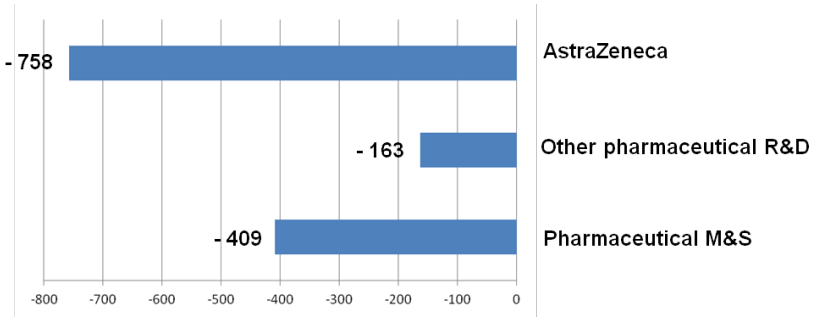


Figure 4: The figure illustrates AstraZeneca's contribution to the reduced workforce in the Pharmaceutical sub-sector.

DYNAMICS IN CHANGES OF WORKFORCE FROM 2009 TO 2011

Figure 5 shows the balance and dynamics of employment by sub-sector over time. Although the total workforce has decreased from 2009 to 2011 as documented in this report, this figure shows that a group of companies has also grown in number of employees, suggesting that at least a proportion of the individuals loosing their jobs were employed by another company. Thus, the competence pool has most likely stayed in the region to a large extent.

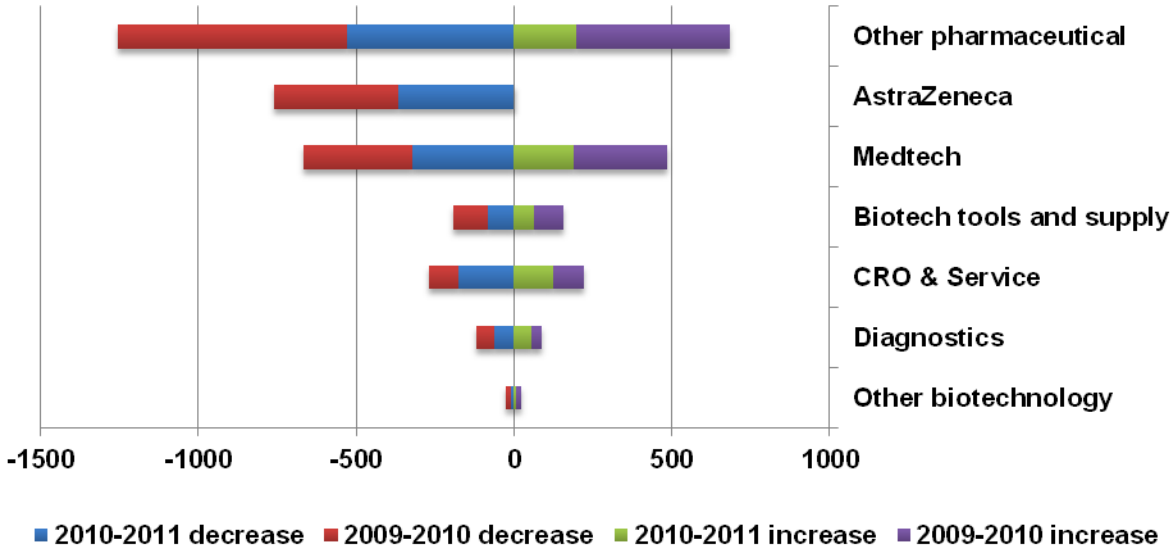


Figure 5: The graph shows changes in number of employees year by year from 2009 to 2011. AstraZeneca is shown separately from the pharmaceutical subsector to illustrate its large contribution.

WORKFORCE - DEVELOPMENT FROM 2009 TO 2011 BY COMPANY SIZE CLASS

There is a large number of small and medium sized innovative companies in Stockholm-Uppsala region. *Figure 6* demonstrates that companies with 11-50 employees has grown. The other size classes have decresead in number of employees from 2009 to 2011. Astra Zeneca represents the largest decrease in employees by almost a 10-fold compared to the other size classes[20].

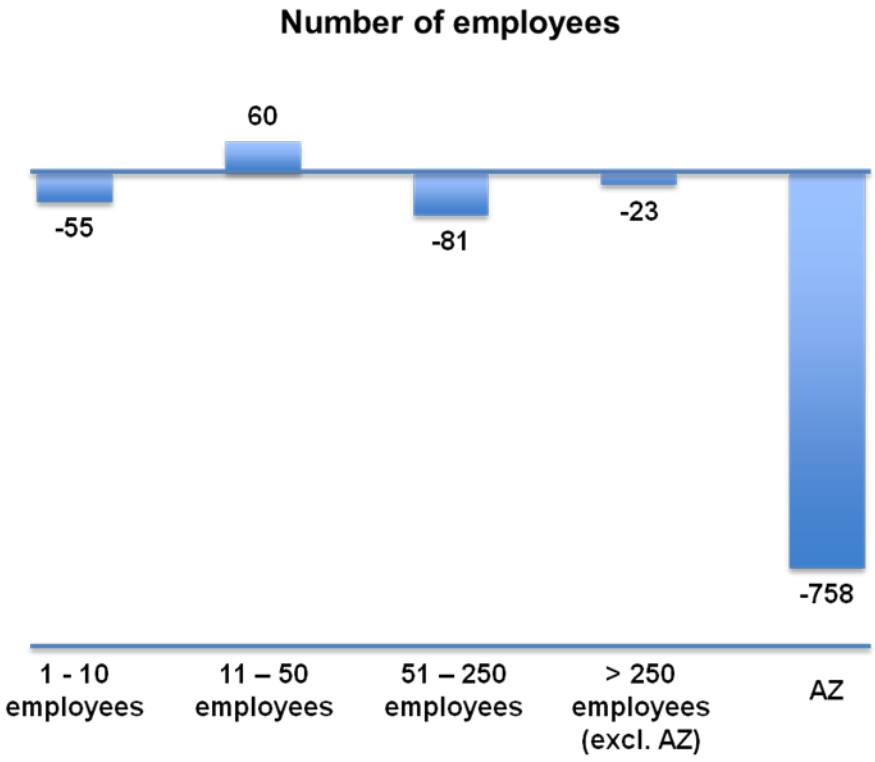


Figure 6 shows the change in workforce by company size class. Astra Zeneca (AZ) is shown separately. The size classes are the same as those applied by the European Commission.

[20] 55 active companies 2009, representing 761 employees underwent mergers and acquisition or decresed their workforce for other reasons. As a result, these companies reported zero employees 2011 and are thus not taken into account in figure 6.

SUB-SECTORS AT THE DIFFERENT GEOGRAPHIC LOCATIONS 2010

The Stockholm-Uppsala region as defined in this report is illustrated in *Figure 7*. It contains three main bio-clusters located in the three counties of Stockholm, Uppsala and Sörmland. The life science region is thus concentrated within a 1. 5 hour travel radius with excellent transport connections.

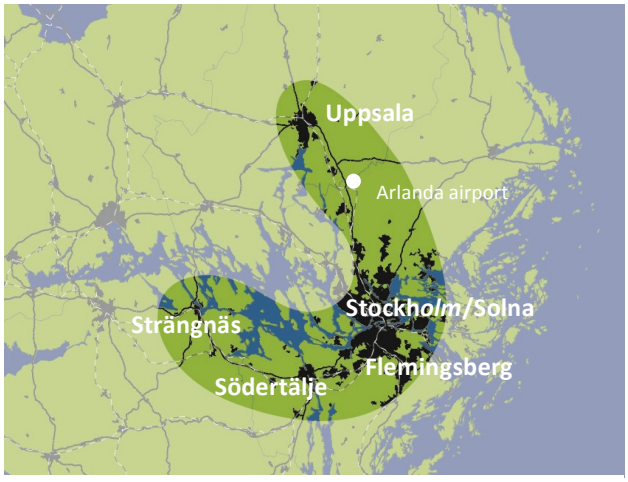


Figure 7. The Stockholm-Uppsala region.

Stockholm county

Stockholm represents the greater Stockholm area, including Flemingsberg, Solna and Södertälje. Pharmaceutical and Medical technology companies are the two predominant types of employers in the Stockholm area. AstraZeneca accounts for as much as one third of the life science industry in this part of the region. Of the remaining pharmaceutical companies, the two largest, Octapharma and Swedish Orphan Biovitrum both have a Pharmacia heritage. Among the medical technology companies, St Jude Medical is the largest, being based on the development and manufacturing of the implantable pacemaker, an innovation from Stockholm more than 50 years ago.

Uppsala county

In Uppsala, the predominant employers are within biotech tools and supply and the pharmaceutical industry. Here, the heritage from Pharmacia is even more evident. Uppsala has a proud history within protein chemistry/protein analysis dating back to the invention of the ultracentrifuge by The Svedberg, Nobel Laureate 1926. Two decades later, in 1948, Arne Tiselius, trained at Svedberg's laboratory was granted the Nobel Price in chemistry for his innovation electrophoreses, a milestone technology, still applied globally for the analysis of proteins. Protein science is still one of the strongest research fields at Uppsala University. Industrial applications were developed by Pharmacia and today, GE Healthcare Biosciences, global market leader in protein analysis and separation, plus additional smaller companies and Uppsala University carries this strong tradition further. Other Uppsala-based companies with a heritage from Pharmacia (and/or Kabi) are Q-Med, Fresenius Kabi, Abbott Medical Optics and the diagnostics company Phadia (now a division of Thermo Fisher). It should be noted that even though diagnostics companies are not the main employer in Uppsala, the city is a stronghold for Swedish diagnostics development and manufacturing.

Sörmland county

Pfizer and Pharmacia merged in 2003 and Strängnäs in Sörmland is home to Pfizer's biomanufacturing facility. In Sörmland, more than 90% of the work force belongs to the pharmaceutical sector.

The number of employees by sub-sector and county in the region is represented in *Figure 8*. The differences in sub-sector distribution between the counties can largely be traced back to the history of the Swedish pharmaceutical industry represented by Pharmacia, Kabi (merged with Pharmacia in the early 90s) and Astra. As many as seven out of the ten largest life science companies have a Pharmacia heritage (see *Table 2*).

Distribution of the workforce between sub-sectors in Stockholm, Uppsala and Sörmland 2011

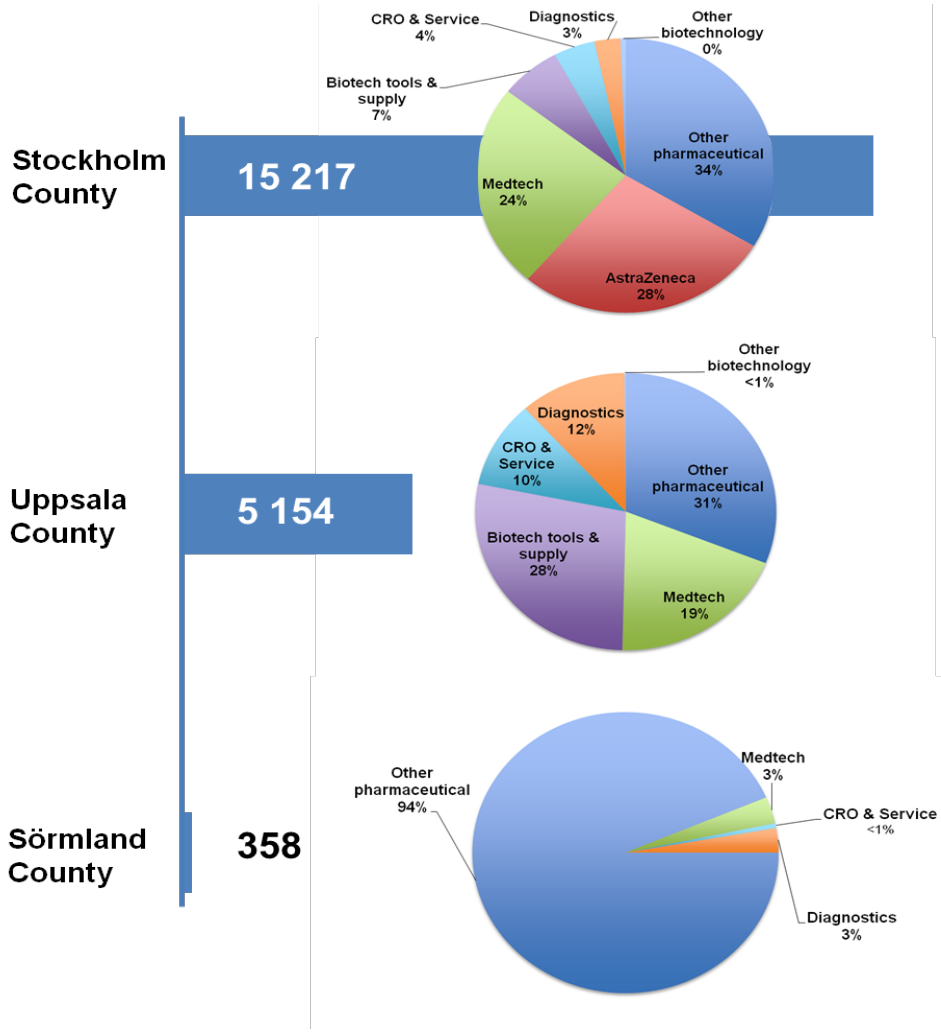


Figure 8: The bar diagram shows the distribution of the work force within the life science sector between the three counties in the region. Stockholm, Uppsala and Sörmland account for 73%, 25% and 2% of the work force respectively. The pie diagrams show the number of employees by sub-sectors in the three counties. In Stockholm, about 60% of the work forcework in pharmaceutical companies, about 25% within medical technology, 7% within Biotech Tools & Supply, 5% within Diagnostics and 3% with CRO & Service. In Uppsala, Pharmaceutical companies employ 31%, followed by Biotech Tools & Supply companies (28%), medical technology (19%) and diagnostics (12%). In Sörmland, the pharmaceutical sector dominates and accounts for more than 90% of the work force.

CHANGES IN NUMBER OF EMPLOYEES FROM 2009 TO 2011 IN STOCKHOLM AND UPPSALA COUNTIES

Stockholm County and Uppsala County exhibited marked differences concerning the development of the workforce. In Stockholm county, restructuring and merges of large companies like Astra Zeneca, Whyeth and St Jude has resulted in a continuous reduction in number of employees from 2009-2011. In Uppsala county, there is an overall increase in the workforce (*Figure 9*).

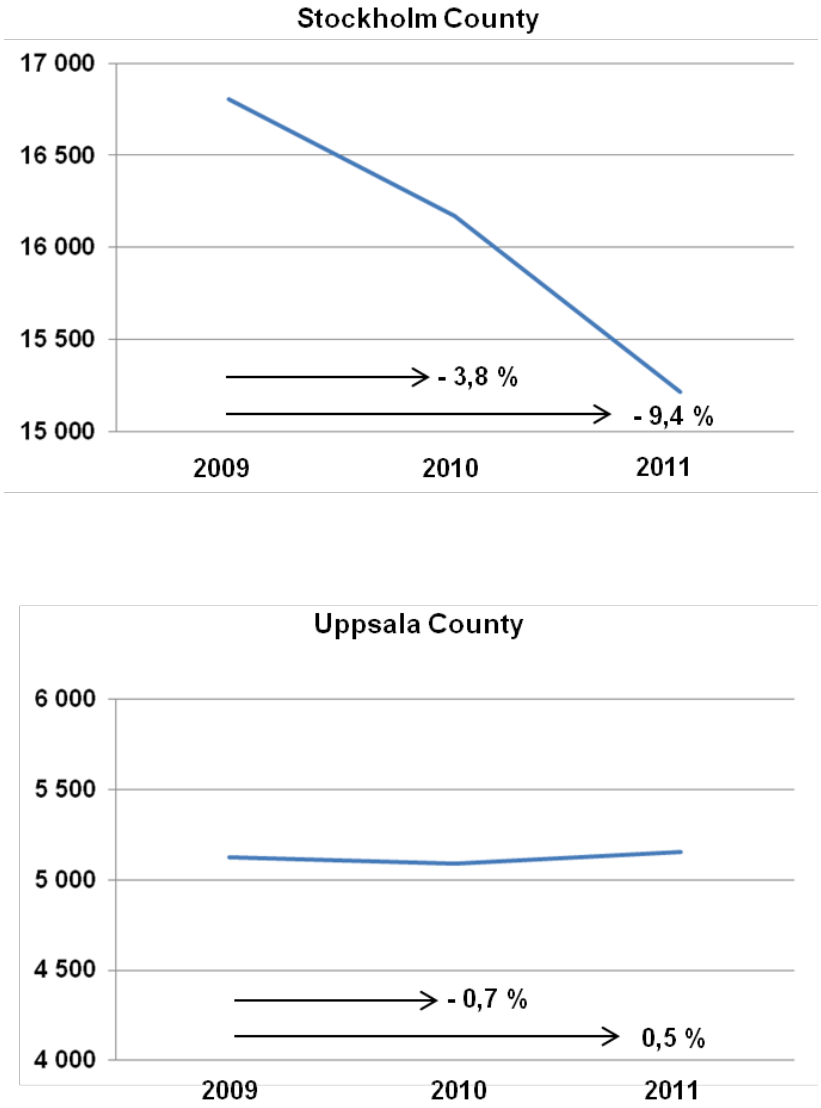


Figure 9: Stockholm County and Uppsala County exhibited marked differences concerning the development of the workforce. While Stockholm County showed a continous decline year by year from 2009 to 2011, Uppsala County showed only marginal changes.

The size of the workforce in Sörmland county decreased by 58 individuals (- 14%) from 2009 to 2011. This drop accounted for 6 % of the total decrease in the region.

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in October 2013

Methods

The purpose of this report is to describe the full range of competence in the life science sector in the Stockholm, Uppsala and Sörmland region. The competence pool is a prerequisite and engine for innovation and growth in the region and represents a critical mass of knowledge and skills throughout the entire value chains of the pharmaceutical, biotechnological and medical technology industries.

Dynamic and transdisciplinary industries - such as the Life Science sector - are often difficult to capture and identify by solely applying standard, accepted industry nomenclature such as the SNI[21] coding system. Instead, a large number of overlapping sources and methods are used to collect, select and categorize companies engaged in life science. As a result, recurring reports of the life science industry by different organizations differ substantially in both the way companies are included in the datasets as well as their categorization.

This report, which is the third consecutive annual report, represents a major revision from previous years and is based on an improved and updated dataset which has been fully consolidated with the dataset used in VINNOVA's, a national agency for Innovation systems, recurring life science reports. The rational for this is to:

- improve data quality and the comprehensiveness of the inventory of companies for the region.
- create one common dataset with life science companies from the Stockholm-Uppsala-Sörmland regions from which regional organizations and VINNOVA can generate independent reports describing the sector.
- synchronize definitions and categorization of individual companies as much as possible so that resulting reports can be compared.
- be able to communicate the status of the region's life science industry in a transparent and comparable way.
- develop a more efficient process for updating of the database in the future.

The workflow for the process encompassed the following subsequent steps:

- Creating the dataset
  - compilation of data
  - selection criteria for inclusion of companies in regional report
  - synchronization of categories with VINNOVA's system
  - categorization
  - acquisition of official business data for selected companies

Creating the dataset

Compilation of data

This dataset was developed in close collaboration between Stockholm Uppsala Life Science, Stockholm Science City, UppsalaBIO and VINNOVA. The current dataset is a compilation of data based on:

- SNI codes[19]
- Previous reports (VINNOVA)[22]
- Lists of companies available from life science trade organisations[23]
- Lists available from incubators and science parks[24]

[21] *SNI: Swedish Standard Industrial Classification is based on EU:s recommended standard NACE Rev.2. It is primary an activity classification. Production units as companies and local units are classified after the activity which is carried out. One company or a local unit can have several activities (SNI-codes).
[22] A report from VINNOVA published in 2011 (Life Science Companies in Sweden, VA 2011: 03, Anna Sandstrom - VINNOVA and Tage Dolk & Benny Dagger - Addendi AB). A list of companies included in that study with address in Uppsala, Stockholm or Södermanland counties were used as source material.
[23] SwedenBIO, LIF, Swedish Medtech, ASCRO
[24] STING, KISP, Serendipity Innovations

- Lists of companies available in the Life Science Sweden's industry guide[25].
- The latest dataset from VINNOVA for the Stockholm-Uppsala-Sörmland regions.

This work resulted in one single, unified overall list of companies, each categorized in a consistent way so that it translates between the region's and VINNOVA's categorization systems (see Table 4 below).

Selection criteria for inclusion of companies in regional report

The selection of companies for the current report was based on the same criteria as in previous reports as described in *Table 5*.

Harmonization of categories with VINNOVA's system

Stockholm-Uppsala region and VINNOVA has previously used overlapping, but different categorization systems as well as views on how individual companies should be pigeonholed. In this work we have harmonization the two systems and created a legend for how they are related. Every single company has also been re-evaluated to maximize uniformity with VINNOVA.

Companies were categorized in the following three dimensions (also see *Table 4*):

1. Industry sector
2. Type of business
3. Operational focus or sub-sector

Categorization of industry sector, business type and operational focus/sub-sector was based on what was considered to be the company's main business. *Table 4* represents the legend for how the two systems are related. The main differences between the systems are i) that VINNOVA allows individual companies to belong to one or more *industry sectors*, whereas in Stockholm-Uppsala's system each company can only belong to one category ii) that VINNOVA applies a more detailed subdivision of categories in sub-sectors. Thus, one sub-sector category according to the region's definitions can correspond to one or several sub-sectors in VINNOVA´s system. Finally, a number of VINNOVA's sub-sectors have been excluded from the report in the region ("related sector").

[25] Life Science Sweden's industry guide is available at http://www.swedishlifesciences.se/

Table 4: Legend to categorizations

	SULS/UBIO	VINNOVA
Industry sector	Biotechnology	Biotech (multiple criteria are allowed)
	Medtech	Medtech (multiple criteria are allowed)
	Pharmaceutical	Pharmaceutical (multiple criteria are allowed)
	Service	*n/a (no corresponding category)*
Type of business	Research & Development	Research & Development
	Incremental prod & serv dev	Incremental prod & serv dev
	Manufacturing	Manufacturing
	Marketing & Sales	Marketing & Sales
	Consulting	Consulting
Sub-sector	Pharmaceutical	Drug discovery and development Drug delivery Drug production In vitro diagnostics Biotech medical technology Bioproduction
	Diagnostic	In vitro diagnostics Biotech tools and supplies Electromechanical medical devices
	Biotech tools and supplies	Biotech tools and supplies Bioproduction
	Medical technology	Biotech medical technology Implantable devices - active and non-active Anaesthetic and respiratory devices Radiation devices - diagnostic and therapeutic
	CRO	CRO
	Other services	*n/a (no corresponding category)*
	Agricultural biotechnology Food-related biotechnology Environmental biotechnology	Agrobiotechnology Food related biotechnology Environmental biotechnology
	Related sector **(not included in this report)**	Electromechanical medical devices Industrial biotechnology Implantable devices - active and non-active Anaesthetic and respiratory devices Electromechanical medical devices Radiation devices - diagnostic and therapeutic Ophthalmic and optical products Dental devices Reusable and single-use devices Healthcare facility products and adaptations ICT tools Assistive products for persons with disability

Categorization

The categories and their definitions are listed in *Table 5*. Categorization of individual companies was based on review of websites, contact with the companies, previous year's documentation and the companies' business descriptions. For corporations with multiple subsidiaries, the main activities conducted by the subsidiary in the region ruled the categorization. In some, unclear cases as to which category the particular company should be included, the authors' judgment formed the ruling.

Table 5: Definitions and selection critera

Industry sector	Definition
Pharmaceutical	Companies developing and/or markering drugs (both small molecules and biologics) and various kinds of therapeutic products or methods.
Medtech	Companies developing and/or marketing medical products that are not drugs (same definition as VINNOVA).
Biotechnology	Companies developing the application of science and technology to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services and/or marketing these products or services (same definition as VINNOVA).
Service	Companies that provide specific core capabilities and services, including CRO companies.
Type of business	**Definition**
Research & Development	Companies with exploratory research and development. Within some companies there is also sales and marketing activity and manufacturing (same definition as VINNOVA).
Incremental product & service development	Companies which principally develop their own products/services, i.e. incremental product development without elements of exploratory research (same definition as VINNOVA).
Manufacturing	Manufacturing of products. Includes companies specialised in manufacturing but also the production units of integrated companies with more than 500 employees (same definition as VINNOVA).
Marketing & Sales	Operates marketing & sales (with or without a product in late stages - Clinical Trials). These are marked throughout with M&S in the tables. (same definition as VINNOVA).
Consultancy	Companies which principally carry out consultancy and commission activity (same definition as VINNOVA).
Sub-sectors	**Definition**
Pharmaceuticals, medical technology and diagnostics companies	Active in the development and / or manufacturing of products that require Medical Product Agency (MPA) approval (drugs or medical devices), including devices which are invasive and / or exercise physiological and / or metabolic effects.
Biotechnology tools	Companies that develop equipment and methods of analysis, separation and production, reagents, etc. used by companies and academic institutions for research, product development and production in activities involving biological processes.
Other categories in biotechnology (food-related, environmental and agrobiotechnology)	Companies that are developing applications of science and technology of living organisms to develop the knowledge, products and services in these areas.
CRO	Contract Research Organisation, i.e. companies that are directly involved in product development process by providing specific services.
Other service[26]	Service companies that are not CRO as defined above, but in its main business provides specific core capabilities and services with knowledge and expertise that contracting life science companies don't have.

[26] Selection criteria for Other services: Companies that engage in product development and/or manufacturing or offering services mainly within life science and possessing a pool of life science-specific competences and/or intellectual properties within their respective sub-sector of life science.

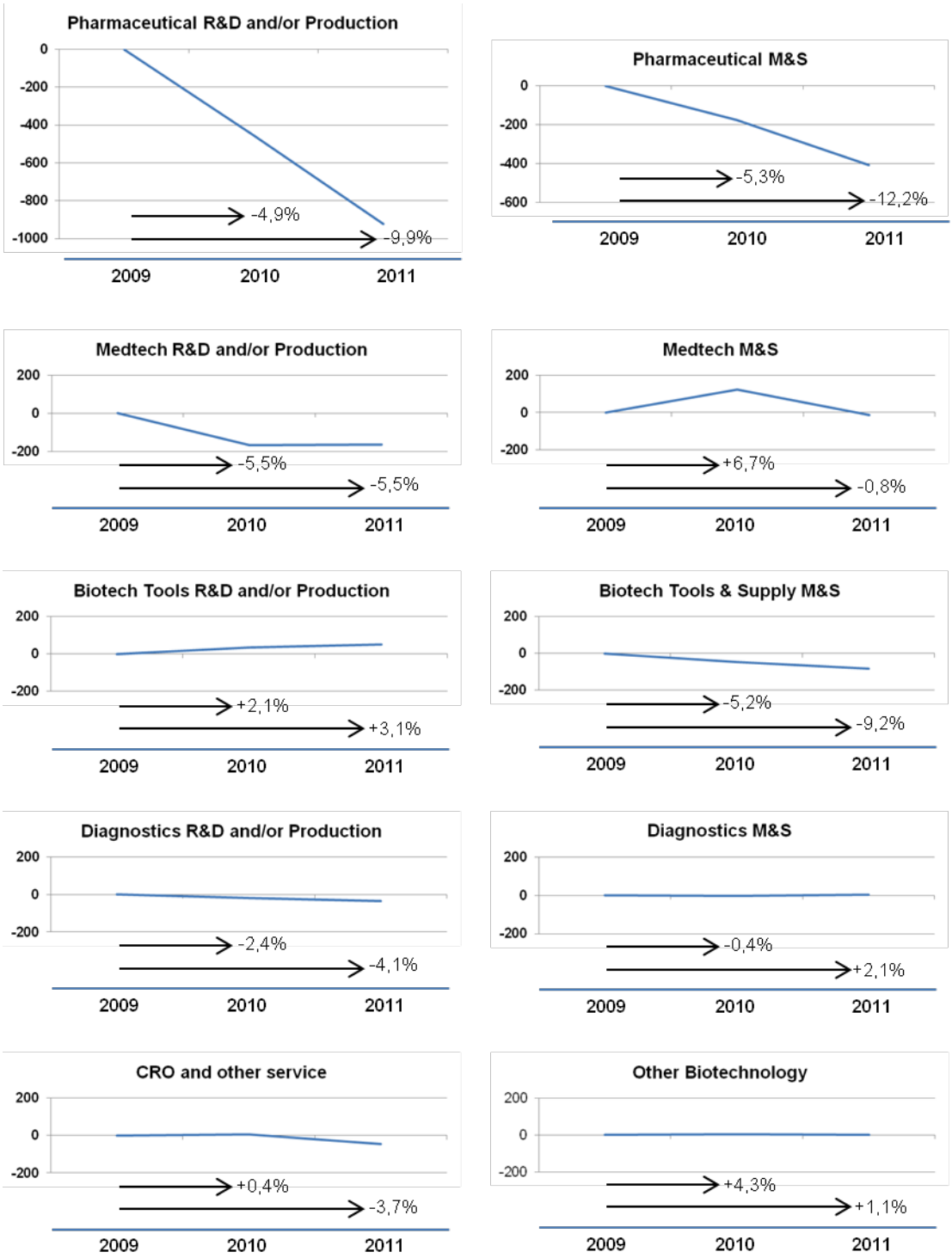
Retrieval of official business data for selected companies

The financial data presented in this report was retrieved from publicly available sources including *Bolagsverket*/Swedish Companies Registration Office (based on each company's annual report). The dataset only covers limited companies. Number of employees are reported for the regional employment sites

For companies with multiple geographical sites, number of employees are reported only for the employment sites within the Stockholm-Uppsala-Sörmland region.

The annual accounting period for a majority of Swedish companies begins in January and ends in December. However, for some companies, the annual accounting period can start in May, in July or in September. In the latter case, data on number of employees and turnover from the company’s annual report which best represents years 2010 and 2009 respectively were used.

APPENDIX 1



Appendix Figure 1: Workforce development from 2009 – 2011 by sub-sector. See also Table 3 and Figure 4. Lines represent changes in the number of employees from 2009 through to 2011. Arrows represent accumulated change year by year. The most positive trend can be seen in the Biotech Tools R&D and/or Production sub-sector. The largest reduction in the workforce can be seen in the pharmaceutical subsectors, led by reductions at AstraZeneca.

The reference group for this study includes the following life science development organizations:

Stockholm-Uppsala Life Science: Stockholm-Uppsala Life Science markets one of the most innovative and productive life science regions globally. www.suls.se

Stockholm Science City Foundation: The mission of Stockholm Science City Foundation is to attract academia and business within Life Sciences to the Stockholm Life. area www.ssci.se

Uppsala BIO: Uppsala BIO is a life science pathfinder which develops programs to make life science flourish in close cooperation with industry academia, society and healthcare. www.uppsalabio.se

The validity of this report (principles for generating the data and company selection criteria) has been validated by an expert affiliated with Uppsala University.

FACTS AND FIGURES ON SWEDEN'S NUMBER ONE LIFE SCIENCE REGION
Published in October 2013