



Carpe Diem...

The art of beauty in time

Hygiene and Safety

Complete guidelines for: aesthetic treatment, permanent make-up, tattoos, piercing

Simona Casadei

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In the second (2017) edition, the chapters dealing with scientific topics have been reviewed by Doctors who deal with Hygiene and Public Health.

In the third (2018) edition, the sanitary and waste issues were reviewed by Dr. Aurelia Fonda of the Italian Ministry of Health, specialized in Hygiene and Preventive Medicine.

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HYGIENE AND SAFETY

Complete guidelines for:
aesthetic treatment, permanent make-up, tattoos, piercing



INTRODUCTION TO THE MANUAL

Dr. Aurelia Fonda

Dr. Aurelia Fonda:

- currently **working** at the **Italian Ministry of Health**, spokeswoman for the **Directorate General of Health Prevention of the European RAPEX alert system**, **graduated in Medicine and Surgery** at the University of Milan with honors (1989);
- **specialised in Hygiene and Preventive Medicine (Hygiene and Hospital Practices)** at University of Milan (under Prof. A. Pagano) with honors (1993);
- from 9/16/1999 until 9/30/2006 director **at the Ministry of the Environment**, **responsible for the technical contents drafts of the environmental and health regulations**, as part of the contingency of experts required by Italian law 475/88, **in particular contributed to the drafting of Italian Presidential Decree 254/2003 regulating Health Waste Management**;
- in 2006 received **a personal decoration from the Italian Minister of the Environment** for institutional health and waste activity;
- **lecturer and tutor in the Italian-Tunisian Seminar on Hospital Waste Management** organized by the Italian Directorate General for Relations with the European Union and for International Relations of the Tunisia Health Ministry as part of the conference Les 15ème Journées Nationales d'Hygiene, Hammamet, Tunisia;
- **lecturer in 2012 and 2014 at the courses Authorization, Control and Supervision in the Field of Tattoo and Permanent Make-up**, organized by the **Higher Institute of Health** and ONDICO, **teacher at numerous courses for the NAS**.

Three adjectives to describe Simona: Enthusiastic, determined, professional.

Three adjectives to identify the manual: Detailed, complete, necessary.

I met Simona by phone and what impressed me most about her is her determination and enthusiasm.

Correct hygienic-sanitary guidelines for operators in the aesthetics sector as well as in people services in general is particularly delicate for those whoever believes in prevention. We wish to do our best because the customer has the right that all the precautions are respected and the transmission risk of serious illnesses is minimized.

The phone call of Simona brought me back in time when – only just after my graduation – I used to work in the health department and I was responsible for shop inspection. This is why I gladly accepted to read and revise this manual; it makes a fluent and even catchy reading and is at the same time accurate and complete.

I hope this text can find its right place among the desks of young people who choose to work in the field of aesthetics services (permanent makeup, aesthetics, tattoo, piercing), but that it will also be read by those who already work as such and want to refresh to ensure the best results for their customers.

Good luck to everyone.

Aurelia Fonda





European Confederation of Professional Beauticians and Cosmeticians

CEPEC - European Confederation of Professional Beauticians and Cosmeticians - based in Brussels, is the **European Confederation of national associations representing beauty centers** in EU countries;

- was **created in 1995** by a group of national aesthetics associations and the first meeting between the representatives of the various countries took place in Tunisia. Since then, many **members** have joined the CEPEC which **today consists of Cyprus, France, Greece, Italy, Spain, Luxembourg, Malta, Slovenia, Latvia, Estonia, Finland**;
- is committed to promoting better conditions **for the development of aesthetics companies at European level** and has been very active towards the European institutions by presenting matching positions on the issues that have an impact on the profession of esthetician;
- is currently engaged in **various projects** developed along the lines of EU programs, such as Erasmus+ to create a European standard **for social aesthetics specialization** or, in a project Capacity Building to promote best practices and to **strengthen representation** in countries where this does not exist;
- is a **member of UEAPME (European Association of Craft, Small and Medium-sized Enterprises)** the organization of employers representing **the interests of crafts, businesses and SMEs (small and medium-sized enterprises)** at European level (about **12 million enterprises employing 55 million people** across Europe) and participating in various committees of this organization (training, environment, social, fiscal, etc.).

CEPEC:

- **called my book Hygiene and Safety a useful and necessary tool, authorizing me to use the CEPEC logo** in future publications, events and manifestations;
- **recognizing the importance of hygiene for the safety** of the esthetics centers and of their clients them, is committed to **promoting** a higher degree of **knowledge and competence** among the operators in the sector regarding the aspects of hygiene and safety and, for this reason, considered that **the diffusion of the book Hygiene and Safety in beauty centers and the training schools** could provide a very important contribution with its specific contents;
- **will publish Hygiene and Safety on their website** as from September 2018. The Associations of aesthetics centers in the various EU countries participating in CEPEC will be able to invite **Simona Casadei** to directly promote the dissemination of the manual in their country and every single organization can advertise the manual also through its website.



Mrs. Laura Grilli
President of C.E.P.E.C.

BIOGRAPHY

Simona Casadei

Thanks for opening this page.

My name is **Simona Casadei** and I'm an aesthetician and tattoo - make-up artist who has specialized and worked in permanent make-up for 25 years.

In 1997, I have opened a private studio with registered trademark and logo: **Carpe Diem Tattoo** by Simona Casadei.

From 2000 to 2017, I was the sole owner and operator of my **Carpe Diem Tattoo** studio dedicated exclusively to **permanent make-up: eyebrows (with machine and microblading), eyes, lips, scars, breast areola, tricopigmentation and needling (CIT - collagen induction treatment)**.

I am the founding partner of the first ever Italian Association of Permanent Make-up ATEC (Association for Corrective Aesthetic Tattoos) which for almost 10 years I have directed together with the President and Vice President. In the ATEC, I have been dealing with the sector's novelties by following manufacturing companies, courses, products, fairs and congresses to be able to convey all the information to our members.

I started working as a make-up artist in the showbiz world of Milan in 1993 and then carried on with artistic tattoos to obtain the Aesthetics Diploma, specializing in permanent make-up, which is my true passion.

I participated in the first course on the aesthetic tattoo of breast cancer patients organized by the LILT (Italian League for the Fight against Tumors) at the Treviso Hospital, Italy, becoming among the first certified aestheticians in Italy for this type of treatment.

I have followed **advanced courses all over Italy and abroad with world celebrities** (including: Holgher **Hoffman, Van Der Velden, Toni Belfatto, Natalia Yeremenco, Mary Rictherson, Victoria Ammoscato, Katerina Zapletalova, Alexandra Goreka, Branko Babik, Nadia Gulan, Karen Betts, David Zhang, etc...**) which I am very proud of as I have met wonderful people who have helped me grow and become the professional I am today.

In 2016, I published my first book **Hygiene and Safety - Complete guidelines for: aesthetic treatment, permanent make-up, tattoos, piercing** (Italian edition) and **I have registered it © in Italy and worldwide.**

Since then, the manual contents have been checked, updated and enriched in order for them to be perfect and provide total safety. In particular:

- in the second edition of 2017, **the chapters dealing with scientific topics have been reviewed by public health physicians**, and the manual has been **translated into English**;
- in the third edition of 2018, **the sanitary and waste-related issues were reviewed by Dr. Aurelia Fonda, hygiene and preventive medicine specialist at the Ministry of Health in Italy.**

I was a **speaker** at **congresses, conferences, fairs and events** of the sector and **hygiene inspector in the International Competitions of Microblading and Permanent Make-up.**

In recent years, **I worked with several aesthetics, make-up and nail art magazines**, writing articles on industry news.

My aim is to spread the hygiene message over the world of aesthetics, permanent make-up, tattoo and piercing, by divulgating all the secrets I have acquired over so many years of experience in the sector.

I have a thousand new projects for the future, always in the field of permanent make-up!



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PREFACE

THE PROMISES

I've decided to write this manual to teach everything I've learned in these 25 years of activity.

I have created my own way of working with rigid rules for both the operator, that is you, and the customer. I repeat, it's my way of working!

I'm here to pass on all of my secrets. I do not want to hold anything for me and, above all, I want to be honest, as I have met Masters who have not been.

For the first time, those who run a course are finally free from companies and brands that force them to tell the usual "lies"!

I would like to convey my professionalism and passion for this work.

Whoever has chosen this field and wants to set up and run a tattoo - piercing - pmu (permanent make-up) activity must absolutely know and practice hygiene first, and only then have basics of anatomy, make-up, aesthetics and tattoo.

In this book I will only deal with hygiene and safety.

Performing a tattoo - piercing - pmu on customers means guaranteeing their health and making them more beautiful: we have enormous responsibilities with regard to both our health and our customers, and we have to safeguard everyone's health as best we can, by all means.

In the first courses I attended on tattoo - piercing - pmu, the only hygiene that was talked about was using a disposable needle. It is not enough!

No one stopped to teach true hygiene. More than 20 years have passed and finally some things have improved in basic courses, but it is still not enough!

I feel very sorry and I regret when I see on the internet or in congress videos highly esteemed operators who do not use the correct hygiene rules. Those who teach must absolutely be an example to follow.

I hope with these guidelines to make you understand the importance of looking after even the smallest detail. I am a precise and meticulous person of character, I love my work and above all I love my clients.

I would like to become an example for all those who are starting now and feel somewhat lost in this sea of often incorrect and discordant information.

Always use your head in this work! Sometimes I see operators use disposable gloves throughout the treatment and then, at the end of the procedure, they

spread cream with their fingers on the treated part of skin. At other times I see the disposable cover placed on the cable and not on the machine. Think, please think!

You can, in fact you must, always be top professionals, this will make you work better, earn more and, above all, join the most authoritative group of experts in this sector.

If you put all of my secrets in practice, I'm sure you will get great results.

THE RESULTS

First of all, I want to tell you something about me.

Since my childhood my passion was make-up and already in kindergarten I used to practise on all the dolls!

Every year I could not wait for carnival so that I decorate me and my friends, every excuse was good to experiment with colours and make-up.

I graduated in accountancy following the career choice of my parents because they wanted to give me a solid foundation and I will always thank them for it; and it has served me to manage my accounts and above all to manage my business!

As soon as I graduated, I went to Milan to attend the best school of artistic make-up of that period, obtaining the highest marks and graduated with honours. It was a wonderful experience.

Already the first year after school, I was studying, and working to make myself a living. It was all so exciting, I was dreaming: finally I could do make-up all day and get paid to do it. Fantastic! It was pure adrenaline. From that moment on, I understood what I wanted to do. My dream had come true.

My passion had become my source of earnings: it was the most beautiful thing in the world ... it is still the most beautiful thing in the world!

I started doing make-up for shows, television, newspapers, fashion shoots and catwalks and it was all great. I've always been very precise, so photo make-up was my favourite and I could show off my best qualities.

I was 20 then, and worked 20 hours a day without ever complaining or feeling tired: I did what I liked. It has always been an infinite satisfaction. I loved my job right away and surely, for this reason, I've always worked so hard.

I remember that my friends were all dancing and going out every night, but I was always working. This is not a complaint: it was my choice. I liked my work so much that all the sacrifices I made were my strength. Milan and this activity have also changed my character because at first I was timid, closed and introverted, but I

had to change my personality to be able to emerge. I remember every sacrifice was a good test. This is the spirit that makes you grow and improve. At age 20 I was saving already because I wanted to create my own studio without asking anything to anyone.

I had come to Milan without any knowledge and I made all the choices in my life with respect for my values and principles. I have always preferred not to work with companies because I needed to feel free to make my own decisions. The showbiz make-up period was very important and made me realize it was not really going to be my place forever because I'm very sincere and I'm not hypocritical or a flatterer, so in those circles I felt somewhat out of place. However, I wanted to do make-up, make people nice, and also for my work to stay, to be permanent. It was a shame to know that after an hour of make-up and an incredible transformation, my client would have washed away my work of art.

That's exactly why I decided to try the first course of permanent make-up. It's been love at first sight. I had the basics of make-up, those of aesthetics and anatomy, and now I could even tattoo. In a moment I decided to leave everything I had created to embark on this new adventure. I started working for free, then just having my expenses paid, and later, when I felt ready, knew I could ask for the right pay.

I worked around Italy from Monday to Saturday and on Sunday I often attended courses to further improve my skills: I always invested everything I earned in courses, machines, inks and anything that could help me grow.

I am deeply grateful to all the owners of the centres and studios I have worked in those years because I have learned very important things from each of them.

When 25 years ago I started working as a freelance professional in permanent make-up, in Italy this method was little known and the existing operators had done more harm than good. It was my time, it was my luck. I immediately started correcting the jobs gone wrong by my colleagues and made a name for myself quickly.

In 2000 I opened my own studio in Forlì in Italy, so that I could return close to my family origins: a winning choice.

In that same year I also registered **my logo** and my tradename that I have been using for years now: **Carpe Diem Tattoo by Simona Casadei**. My customers from the beginning knew me as Simona of Carpe Diem Tattoo and not Simona Casadei and I really liked this because I've always felt one with my work.

Taking everything into account, I feel very pleased with my working life, because for more than 20 years my life and family have been enjoying a pleasant living standard. As for me, I have been managing my own studio for over 18 years and

have customers who come from all over Italy who are willing to wait for as long as two years if need be. They are wonderful, I love them all.

In 2000, together with my colleagues in Italy, I initiated and founded ATEC - Italian Association of Aesthetic Correctional Tattoos, the first association of this kind that made me known as the "manager of all novelties". I checked and updated on all courses, congresses, fairs and manufacturers with new products and machinery. It was very interesting. With ATEC we organized the first congresses and courses in Italy with the participation of the world's top experts in the industry. Also these have been wonderful experiences.

In recent years, I have slowed down the commitments with ATEC because my heart brought me to Rome and decided to leave the board.

ATEC was born with a primary purpose: to give information and have more and more permanent make-up operators join in order to create an exchange of opinions, advice, and secrets so that we all grow together. We count 14 founding round table partners, and exchanging our working methods through friendship we have made tremendous progress.

What I want to do now with you is this: to tell you everything I learned, remembering that the experience of each one of you will be important for everyone else - in order to grow together.

My results were absolutely amazing and I feel sure I can help you feel excited and happy to have chosen this profession and me as your teacher!

Thank you for the opportunity you give me.

PROBLEMS

Hygiene is the most important thing in this profession.

When I started, I was told that I should use disposable gloves, a mask, changing needles and tips after each customer, and a new ink pad for each of them. Now, honestly, I would say that is too little!

After all these years at least something has changed but there is still no complete course on this subject.

Finally, in Italy, the various ASLs have created tattoo-piercing-pmu courses on hygiene. It is a pity, however, that each Region can decide on their own and according to their own time schedule, and that there is a variety of courses from 12 to 600 hours. I find it absurd that in some Regions, after a 12-hour hygiene course, an operator can open a studio and have his or her licence. Maybe 600 hours are too many, but 12 are really ridiculously few. It's shameful. With a piece

of paper you get after a 12-hour course, I do not feel it is right to be able to work on a person, because, in these courses, they do not teach the practice of tattoo - piercing - pmu but only some basics of hygiene.

I will fight with all my strength so that the hygiene and safety is known and practiced by all the operators in this field and will continue to inform future customers about everything they absolutely must know before getting a tattoo - piercing - pmu. It will be my customers who will help the market to be more and more up-to-date and safe!

When customers learn to choose hygiene and health instead of saving a few euros, they will create a professional market and incompetence and ignorance will be eliminated. I'm convinced.

That is why, and here I address the ones between you who are starting in this sector, I immediately advise you to follow the rules of hygiene to the maximum, so you will position yourself within the market as an experienced, authoritative and capable operator.

If – just for fun – you see at the beach just how many people “wear” tattoo - piercing - pmu, you will notice that the average might be at least 5 out of 10.

Healthcare should once and for all deal in this area in a hands-on way, give strict rules of hygiene, study at a round table together with tattoo - piercing - pmu professionals of respectable courses across Italy.

The risk of those who start working in this field without having a solid and correct basis for hygiene is to make mistakes at the expense of their health and that of their customers.

I have decided to give a good kick to the whole system with accurate and detailed information that must be scrupulously respected!

For many years I have been teaching courses in Italy and abroad with the best experts and with all the manufacturers in order to find the most appropriate products and equipment: it is really difficult because what they say, often is not true. Many times the equipment seems to be hygienic, but during use it turns out that they are not; some inks even though categorised as compliant with the norms, do not stay on the skin as they say or even change colour. Also the range of needles is a mine field.

I've been working hard to find solutions to these problems.

Research, research, and research because I want to respect the regulations, safeguard my health and my customers' and reach the best result. Sometimes it was difficult to be able to put all these things together.

The company's courses in reality are occupied with the selling of equipment, products and more courses. These usually last anywhere from 1 to 3 days where

theoretical lessons is concerned, in which you learn fast what tattoo - piercing - pmu is about and what can be done. These are followed by practice sessions with live model technique demonstration by the teachers and with the practice hours for the students on synthetic skin. In order to participate during the course, it is common that the company "obliges" the trainee to buy a package consisting of several products and machinery. In the past it was even worse because you had to buy the machine without having tried it, in a closed box, experimenting it directly on people, "guinea pigs"! The risk of new equipment working well on synthetic skin but not being suitable for human skin was enormous.

Of course every time you change equipment you have to buy everything you need for that equipment and this over the years involves an exaggerated product stock. Every six months or once a year at least each manufacturer proposes a new line of machinery and products. Over the years I have accumulated so many products that many have remained unused and have expired over time.

If I were to account for what I spent among courses, gadgets, needles and tips, and disposable inks and materials, I'm sure I could shock you!

I have thrown the earnings of many hours of hard work into courses and materials that were useless. Not to mention extra charges such as hotels, trains, taxis, food and, above all, missing out on paid jobs I could have done instead. Not to mention the time I wasted because many courses dealt with the same topics, because the teachers were not good, even breaks with entertainment shows, because of a precarious organization, money wasted on gala dinners. Such frustration. When you spend a lot of money on a course, you want to learn new things and you want the teachers to spend their time on the students, every minute of their time.

These are just some of the problems I have encountered in over the years and since I have lived of my own resources, I feel very close to you, finding yourselves at the beginning of a new career, not knowing where to start in this shark tank. I know all the problems that will come along your way because I had to fight them every day. I could almost say that I am able to read your thoughts and to understand your moods. That is why I decided to take you by the hand and accompany you along this growth path together.

Whenever you feel you won't make it, always remember that I have also faced what you are going through and started with fears and worries, but the love for this world has made me go on and get to where I am now.

Keep your head up and become responsible professionals, this will be the key to your success.

MY HISTORY OF DIFFICULTY

I was 19 when I decided to go to study make-up in Milan, my passion.

I can easily say that until then I had lived at home with mom, dad and my twin sister in Forlì, always very protected and spoilt by them. I had never taken the train or the subway alone.

All at once I found myself in a huge city, in a house that I had to share with other girls, in a new school, with new friends, a new job, and above all I had no acquaintances or recommendations.

It was all wonderful and scary at the same time. I had to wake up in a hurry to emerge.

At the beginning, while attending the Artistic Make-Up at BCM (Beauty Center of Milan) by Stefano Anselmo (an Italian celebrity), I worked for free and in the evening I was studying until late. Despite all the commitments I managed to graduate with honours at the institute.

I looked after myself and sometimes did not eat in order to save money and buy the products I needed. I did not want to economically weigh on my family because they had made so many sacrifices for me to study.

When 25 years ago someone wanted to do this job, people would call you a failure, it was almost a shame for the family. Just as well that my parents are different and have trusted me and my dreams and pushed me to make it my profession. I will thank them all my life.

Every time I was paid for a job, it was a huge satisfaction that rewarded all the sacrifices.

All the money I earned was used very quickly: firstly for living expenses (rent, transport, food, school), immediately afterwards for new courses (pmu, tattoo, hygiene, PNL, self-esteem, marketing, technology) It was for equipment (machines, needles, inks, disposable products) and finally part of it was set aside to create something of my own one day.

Finally in the year 2000 I found the courage and opened the first Tattoo and Permanent Make-up Studio of my Region, Emilia Romagna in Italy: what satisfaction!

If I had to do a quick count of the expenses incurred during all the years of activities for courses and materials, not considering the extra costs (hotels, trains, taxis, food) and the lack of earnings, I'm sure I would exceed 100 000 euro!

Just over the last 3 years, I have spent about 30 000 euro attending courses with world celebrities.

So much time and so much money!

Those of you who now start working with pmu can quickly reach the same results

I achieved in all these years of activity, and this is because, in the first 15 years, there were no interesting courses and I was practically self-taught. There was no occasion to practise new methods, and they became old already the following year. I think I have practised more over the last 3 years than in the rest of my whole life.

Today, when I look at the photos of my first jobs, I “shudder,” because I no longer use those techniques, but considering the time they were done in, however, I always recognize myself for my precision, professionalism and personal style.

I have customers who come to me regularly for more than 20 years: we grew together both as individuals and as results. I am grateful for the confidence they gave me when I was inexperienced and still keep giving me, living together new methods I propose them, every year.

I conclude my description of my story of difficulties here, always and thoroughly happy about my life journey that made me become who I am.

I wish with all my heart to find the right courses and teachers for you, which can make you grow and become serious professionals in tattoo-piercing- pmu in the shortest possible time and with the lowest cost.

MY STORY OF SUCCESS

Despite the many sacrifices and difficulties I have experienced, I have always been enthusiastic about my work.

I am a very critical person especially with myself and despite that, I have to admit I'm satisfied with my path.

In 2000 **I opened the first Emilia-Romagna tattoo - pmu centre** in Forlì, Italy.

During 18 years of activity in Forlì alone I managed to do about 2000 new permanent make-up jobs without even advertising, with only the word of mouth of my happy customers. Considering that during my study, I worked only three days a week (the other three I worked at other centres in Italy and in addition I gave myself two months of vacation a year), I would say it makes a good average! In these years, only in Forlì, I have about 1 500 loyal customers who are coming back for retouching.

My customers were used to coming to my studio every six months for a retouch, to maintain the tattoo - pmu in order, and my waiting list was always less than three months. After my son was born, however, I have accumulated delays because, living in Rome, I often needed to go to Forlì. Nonetheless, to my amazement, I found that my customers are still willing to wait as long as two years because

they just want me!

Wow! Such great satisfaction.

In my studio I always used to do everything by myself: phone calls, provide information, organize appointments and retouches, send confirmation messages, receive and process customers, bill, issue receipts, photograph, film, clean between one customer and another and at the end of the evening sterilized the entire work environment. That is why I feel even more proud of myself and my organization.

So far I have only spoken of my Forlì customers because they are the ones who have direct contact with me but I have always felt flattered by the compliments of customers of beauty centres, health centres, wellbeing centres and beauty farms around Italy with whom I have longstanding working relationships.

With the birth of my son, I needed to find good colleagues who could replace me in those distant locations: so my jobs and clients were entrusted in qualified hands. In 2000, **I registered my tradename and my logo: Carpe Diem Tattoo by Simona Casadei** that represents me every day.

In my success story, in addition to my aesthetics centre, now here is **my first book** that will allow me to further establish and position myself as a capable and authoritative professional in the sector.

For someone like me who had only “made tattoos”, writing was a great challenge.

FALSE MYTHS

In the past, there was no complete hygiene course for tattoo - piercing - pmu, so the only thing one could do to keep up to date was to attend many courses, spend a lot of time and spend a lot of money.

In all these years I have invested more than 100 000 euro to be keep at the forefront. STOP! Today everything changes. Now the future is in your hands. I will be your future!

With these guidelines, hygiene and safety are finally treated thoroughly!

Enough of the manufacturing and distributing companies that monopolize the market with their courses.

I want to open your eyes to a world where it's easy to get lost and end up making the wrong choices.

After analysing what's on the market for many years, I will help you choose the safest materials you will need to become a prominent professional.

This will save you time, money and above all, will give you great results right away.

You will not spend extra expenses such as hotels, trains, taxis, restaurants, and you will not miss paid work days!

You will be deciding where and when to study.

In courses, it is unlikely for students to be of the same level and understand the explanation similarly, which is why I thought it would be good if I could start from scratch to bring you all to the same degree of optimal preparation. Maybe for some of you some of my information will be repetitive: if so, consider it to be a review.

I'll be as clear and precise as possible to teach you what I know.

To date, nobody has yet created something like this.

Writing this manual was an incredible, new and exciting experience because I had everything in my head but seeing it take shape and materializing in pages and pages of information was a victory for me.

Please remember, I'm a well-known colleague but not a writer. Be magnanimous: look at content rather than form.

THE NEW SOLUTION

For over 20 years I have been doing permanent make-up, always trying to keep up to date on everything. For the past 3 years I have done marketing courses so that I knew how to make the best use of my computer, to create my own videos, to write books, to write e-books, and so on.

I have created a unique project in order to share all my secrets with you in an original and special way.

I dedicate this hygiene handbook to all tattoo - piercing - pmu operators who want to practice permanent tattoo - piercing - pmu in complete safety, as well as to any future clients who will choose such professional operators.

With this hygiene handbook, I will send you the most complete information possible on such an important topic.

I will keep you by the hand and will lead you step by step to teach you and make you as expert as possible.

I will reveal all of my tricks, I will endeavour to make this the state-of-the-art manual over the years to come.

I will teach you with the simplicity and naturalness that characterize me, all the useful notions for your growth and above all, I will do it in a unique and sincere way because, for the first time, those who do this course are free from the abovementioned companies and their conditioning practices.

I want to help you one by one and pass on my passion to all of you.

I will take care of you and I will take you from A to Z, making you become expert,

I believe in you and in my ability to simplify even the most complicated topics.

With this hygiene book, I hope that tomorrow you will all have the same precision

A great and sincere thank you for the trust you have in me.

I hope to have the opportunity to meet you soon one by one.

Happy reading.



INTRODUCTION

All you need to know to become a professional in tattoo - piercing - pmu (permanent make-up) is:

- **hygiene and safety: behaviour, protocols and regulation;**
- skin anatomy: function, characteristics and most frequent skin diseases;
- anatomy of face and body to be treated: skin, muscles, bones, aging, Langer's lines;
- the drawing: materials, colour theory, chiaroscuro, different drawing techniques, pointillism, shades, watercolour, painting;
- make-up: materials, colour theory, chiaroscuro, different make-up techniques, face-eyebrow-eyes-lips corrections, aging, camouflage, ethnic features;
- tattoo - piercing - pmu techniques (theory, practice on synthetic skin and lastly on live models);
- necessary equipment and products: machines, single-use materials, inks, products, sterilisation and decontamination methods;
- drug interactions, cosmetics and aesthetic medicine treatments (bio-stimulation, dermal fillers, botulinum toxin, laser, peeling, face and breast plastic surgery);
- basics about laws and regulations of the field;
- accounting in compliance with tax regulations;
- basics about NLP (neuro-linguistic programming) and customer psychology;
- sales (sales psychology) and marketing techniques (pictures, videos, website, email, blog, YouTube, Facebook, LinkedIn, Twitter, Instagram, Pinterest, Skype, WhatsApp, Viber, Messenger, Google, Yahoo), to keep up with the times and be able to marketing your activity by your own.

Moreover, doing well in this job means having good manual skills, code of ethics and aesthetic sense.

Unfortunately, to date no complete course providing all these skills has been delivered, neither in Italy, nor worldwide. There are courses organised by the **Italian Local Health Service** in different municipalities in Italy, but they are focussed on hygiene issues, and contents may well vary from region to region, since the duration ranges from 20 to 600 hours. **The Local Health Service** is a public body of the Italian Public Administration, in charge of allocating health care services on behalf of the National Health Care System in a specific territory.

There are also courses organised by producing/selling companies of equipment and materials, which main goal, however, is selling and not teaching.

Working in safety is essential for any new operator, which is why I believe in the importance of an **initial training** in a professional centre, where you can observe and learn techniques and procedures. Once gained enough experience (i.e. 300 hours) through a theoretical and practical training (on artificial skin and live model), a new operator will be able to start treating patients assisted by a tattoo - piercing - pmu professional. You will be allowed to work independently, after this stage only.

Currently, in the aesthetic market there are too many people improvising in permanent make-up, but they are not qualified. In Italy, the number of unqualified people in the tattoo - pmu field is very high. Companies keep on churning out operators who, after a 2 or 3-day course, naively think they can professionally operate on people's skin, often causing damages.

Stop it! It is time to change!

In this book, I want to share my working and professional experience, rich also in information, contents, data and methods collected from congresses, courses, conferences and research during more than 25 years of activity.

I have written this **guide** to deepen the most important aspect related to safety, in **tattoo - piercing - pmu - aesthetics: HYGIENE**.

In this **handbook**, I talk about **hygiene** in a complete way by suggesting **correct manners and operative protocols to be followed in full compliance with Italian regulations**.

Some of these methods are the result of my working experience, some others come from courses and conferences that I attended and developed in this handbook with the purpose of giving a systematic and complete overview of the subject.

Always do your best to become a real professional and fall in love with this job.

Enjoy the reading!

N.B.: I have written in **bold** and underlined those parts you absolutely need to know, in such a way that you can find them more easily.

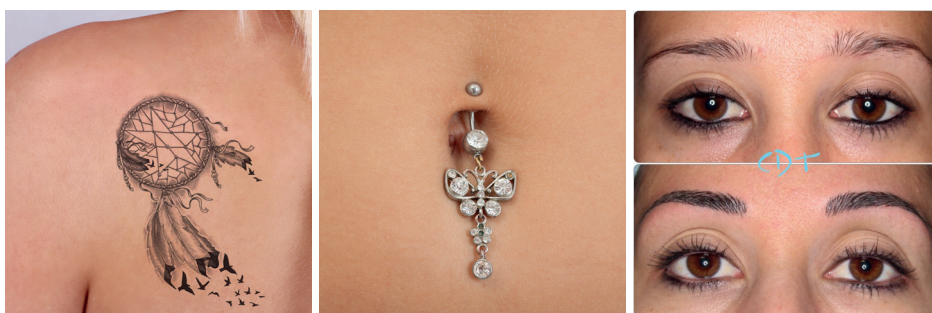
Parts written in *italics* mark both **my comments** and **Italian laws/regulations** that I report **(summarised and simplified)** in order to give greater relevance to the contents of this handbook.

In **parentheses** and **blue bold** there are **cross-references** to other chapters and relevant paragraphs (**See CHAPTER "x", paragraph "y"**).

Chapter 1

TATTOO – PIERCING – PMU

In this first chapter I am going to explain to you what a tattoo - piercing - pmu (permanent make-up) are, who can apply them, their diffusion in Italy and worldwide, the complication risks (undesirable effects and infectious risk, side effects and information) associated with the procedures.



GENERAL INFORMATION

Finally, also Italy has started to regulate more carefully **tattooing - piercing - permanent make-up (hereinafter referred to as pmu)**.

In the Italian version of this handbook, I have included the regulatory framework, providing the most important information for compliance with the Italian law system. I have created a comprehensive handbook about hygiene and how it is regulated by law, trying to keep pace with the evolution of regulations.

Unfortunately, I cannot know the existing regulations of every single country and it would be impossible to write a similar book for non-Italian countries.

I have been considering a translation to English of this handbook for a long time and finally I have come to the conclusion that **hygiene is hygiene** all over the World, regardless of laws!

This book contains what any tattoo - piercing - pmu operator or beautician should know and practice to be able to work safely.

Wherever you are reading my book now, if you want to protect yourself, your customers and your partners, or stand out and be acknowledged as a true professional, you have to absorb even the smallest tip I am going to write here.

I want to unveil all of my secrets so you will be able to work right away in the best way, being also able to convey it to other people (partners, customers) and you make the fundamentals your own and put these strict rules into practice as I propose, you will make a difference and beat the competition.

The goal of this handbook is to take a **message of hygiene** to the **tattoo - piercing - pmu - aesthetics sector worldwide**, to make these activities safer.

I believe in each one of you, in your potential and professionalism.

So far, companies and vocational training institutions have talked about hygiene generically, a bit approximatively, underestimating their invaluable task: giving the basis.

Teaching an amazing technique to recreate the eyelash pattern, hair by hair, or how to use machines, equipment and inks while leaving out basic hygiene rules, is incomplete.

This handbook represents a summary of everything you need to know to work safely. Of course, **you have to comply with the existing regulation of your country** and you need to seek for further information personally. I am sure that my suggestions are far more than what is usually requested to operators of this sector, and this is why I am asking you to be even more scrupulous when following my methods.

Should you be working in countries with a more specific legislation, you have to comply with the applicable regulations and **use my handbook as a minimum quality standard only, never go below it.**

The term **TATTOO** is defined as the permanent colouring of parts of the body after inserting pigments at an intradermal level by means of needles, so to create everlasting and **indelible decorative effects** on the skin.

The term **PIERCING** is defined as the act of **pricking** any part of the human body (e.g. ear, eyebrow, belly-button) with the **aim of inserting** rings or other **decorations** in various shapes and of various materials.

The term **PMU (permanent make-up)** is defined as the technique used with the aesthetic purpose to improve the appearance, to correct face and body imperfections, and to cover scars from surgery or accidents (camouflage). **A pigment is injected through a needle into the skin** (between the epidermis and the superficial derma) **and it remains for a variable period of time** depending on the area of the treatment. The variability is due to the use of some pigment particles that, as time passes by, on the one hand are removed from their place and eliminated by the metabolic processes, or on the other hand they are

eliminated by the skin cell turnover.

The terms used in the Italian regulations texts are both **pmu** and **semi-pmu**; I personally think that they use the same technique, and considering that this handbook **topic** is **hygiene** and they are elsewhere known under a single term, I am going to simply use **pmu**.

The number of Italians undergoing some kind of tattoo – piercing - pmu treatment is steadily increasing.

Consequently, the Italian Ministry of Health has drawn up several specific recommendations to tackle the phenomenon and safeguard the citizen's health. Furthermore, it has adopted a number of measures for the implementation of correct manners and useful procedures for the prevention of infectious and non-infectious diseases linked to the above-mentioned practices.

A **system of hygiene and sanitation protection** has been established based on the essential **requirement of the double eligibility (subjective and objective)** for safe working conditions.

Pmu, being an intradermal injection of coloured pigments through needles, **is submitted to the same subjective and objective requirements of tattooing and piercing**.

The aesthetics activity includes, among others, pmu as a longlasting (but not everlasting) treatment to the face and other parts of the body, aimed at improving or maintaining one's appearance by removing or lessening the existing imperfections.

In Italy, **tattoos and piercings** fall under the **same regulations** as associated activities, while **pmu** falls under **beautician's activities**.

Therefore, **tattoos** are made by **tattooists**, **piercings** are applied by **piercers** and **pmu** by **beauticians**.

In my opinion, these 3 treatments are very similar, since their application involves getting in contact with blood.

Regarding the invasiveness and the risks connected with the healing process, we should distinguish:

- piercing (more invasive and hazardous, with a slow and prolonged recovery and with crucial recovery rules for the customer at home);
- tattoo and pmu (less invasive and hazardous, with a faster recovery and similar recovery rules at home).

TATTOOS AND PIERCINGS DIFFUSION IN ITALY AND AROUND THE WORLD

TATTOO DIFFUSION

People tattooed around the **world**
in 2012:
approx. **80 million** in the **USA**;
approx. **100 million** in **Europe**;
in 2015:
approx. **7 million** in **Italy**.

In Italy, a survey of **ONDICO (a Notified Body for Devices and Cosmetic under the Italian National Institute of Health)**, led in 2015 to define how and why people undergo this kind of treatment, revealed that around **7 million people are tattooed**.

The survey has identified the various reasons of this choice (body decoration, or medical and aesthetics goals for pmu). Data revealed also that tattoos are more widespread among women than men. The majority is satisfied with the tattoo, however a high percentage of tattooed people would like to remove it at some point and some have already done it. Men prefer tattooing their arms, shoulders and legs, while women prefer back, feet and ankles. 80% of tattooed people went to a qualified tattoo centre and 10% to a beautician, but a significant 15% did it in other unqualified centres, and this may be a source of risk. Generally speaking, slightly more than half of the interviewees is informed on the most frequently risks like allergic reactions, hepatitis and herpes. Only 40% of them is adequately informed on the side effects of tattooing and 20% of those who went to a qualified centre did not fill in or signed the consent form. According to the results of the survey, 3% of tattoos had some complications or reactions: pain, granulomas, skin thickening, allergic reactions, infections and pus formation. In all cases, only 10% of them went to a dermatologist or to the General Practitioner and 30% went back to the tattooist, but half of them did not consult anybody.

PIERCING DIFFUSION

A **piercing** is the act of pricking some superficial parts of the body with the aim of inserting objects (metals, bones, stones or others) as decoration or ritual practice and **may increase the risk of infections if applied without certain safety standards**.

In Italy, **piercing is more widespread than tattoos**: the few data collected in 2011 highlighted that 20% of **boys and girls (1 in 5)** has got at least one **piercing**.

The trend of Italian companies operating in the **tattoo - piercing** sector, legally registered, has been **steadily increasing**:

- in 2009, 257 businesses;
- in 2012, 1217 businesses;
- in 2013, 1537 businesses;
- **in 2014, 2055 businesses.**

In 6 years, **tattoo and piercing related businesses have increased tenfold. Wow!**

RISK OF COMPLICATIONS, UNDESIRABLE EFFECTS AND INFECTIONS IN PIERCING, TATTOO AND PERMANENT MAKE-UP

RISK ASSESSMENT

*A risk assessment is a cautious exam of what can be hazardous for the costumer in your job, in order to evaluate if the **precautions** you have undertaken are sufficient or if more must be done to **prevent** risks, to avoid injuries or transmit diseases.*

*Risk assessment is made up of **3 stages**:*

- *risk assessment linked to the use of equipment or hazardous substances;*
- *potential accidents to people (operators, customers);*
- **annual update** of the risk assessment, reviewing the equipment and the working process.

The evaluation mainly concerns health risks.

*It is important to focus on two categories of people: **pregnant women and minors**.*

Do not offer tattoo - piercing - pmu to them.

Safety problems related to tattoo and piercing practices

Safety problems of these two practices are mainly, but not exclusively, related to **infection** prevention. **The contact with blood** that typically takes place during a tattoo or piercing application may lead to some problems. Indeed, tools can convey different microbial agents to the blood, if contaminated.

The **contamination** may occur:

- **within the environment** (unclean room or studio, personal hygiene conditions or with poor aseptic techniques);
- **in the transition through the most superficial layers of the skin** (insufficient preparation of the skin area);
- **from previous customers' blood** (inadequate sterilisation or lack of material substitution).

Contaminated tools penetrating into the skin can convey many **viruses**, such as **hepatitis C, hepatitis B, HIV or bacteria**, which are as widespread and dangerous as **Staphylococcus**.

For this reason, tattoo and piercing related activities must **guarantee**:

- an adequate level of hygiene of the staff and the working environment;
- the exclusive use of aseptic techniques;
- an appropriate treatment and disposal of potentially contaminated objects, biological materials and waste;
- an appropriate treatment of the process-related injuries.

Infections can be conveyed by many means. The most dangerous is the transmission of micro-organisms **via blood**:

- from one customer to another;
- from the tattooist/piercer to the customer.

Ways of transmissions can be:

- poor cleaning of equipment between each use;
- clean and/or sterile tools come into contact with used tools;
- clean and/or sterile tools are placed on dirty surfaces;
- contaminated towels, garments, spatulas, single-use gloves;
- unclean materials coming into contact with or handled and used without the due hygiene;
- unhygienic spaces, furnishing and equipment that are not in a good state of conservation and functioning;
- inadequate disinfection and sterilisation practices and/or inadequate equipment.

The **Procedures** implicate the use of **needles and cutters** which may lead to **risks of transmission of infections** provoked by blood-borne pathogens. **Skin infections too**, even serious ones, are possible if hygiene and prevention measures are not scrupulously applied. Such processes can lead to serious systemic infections. There are plenty of **tattoo and piercing-related infection cases** in the literature. Some cases have been associated with the **toxic effects of the pigments**.

1. **You always need to assess the risk of infections before any treatment.**

Considering the impossibility to foresee in advance who is a carrier of blood-borne infections, it is crucial to apply **the same measures for every customer**.

2. **Control measures** are part of **3 categories**:

- a. general hygiene rules;
- b. isolation precautions and universal precautions;
- c. environment control measures.

THE RISK OF COMPLICATIONS WITH TATTOO - PIERCING - PMU

The risk of complications after the application of tattoo - piercing - pmu depends on:

- knowledge and experience of the operator;
- sanitary conditions during the application;
- customer recovery rules (respect of the recovery rules provided by the operator also at home);
- skin area;
- customer health conditions.

The most common **complications** after a **piercing** are:

- **chemical risk**;
- **risk of infections** related to non-sterile tools and/or non-single-use needles. Infections can be caused by bacteria, fungi or other pathogens such as a virus. Here is a list of symptoms of infection: redness, swelling, heat (on the involved area), throbbing or extended pain, oozing out of a yellow/greenish/greyish liquid. In case of an ongoing infection, contact your GP without removing the piercing;
- **allergic reactions**;
- **short-term complications** such as bleeding, swelling, redness or rash (sometimes);
- **long-term complications** as infections alongside with pain, pus, atrophic/hypertrophic scars, contact dermatitis, granulomas, angiofibromas and pseudolymphoma (in serious cases).

Pmu operator may have to deal with the same tattoo-related **complications**.

The most common **complications** after **tattoos** and **pmu** are:

- A. chemical risk;**
- B. risk of infections;**
- C. allergic reactions:** allergic dermatitis, urticarial;
- D. scars** (atrophic, hypertrophic and keloids);
- E. inflammatory reactions;**
- F. ipo and hyper-pigmentation;**
- G. granulomas;**
- H. complications after Nuclear Magnetic Resonance (NMR).**

Here follow the above-mentioned adverse reactions **in detail**:

A. CHEMICAL RISK

Chemicals present in **piercing** can be released in the skin and absorbed by the body. It is important to choose **atoxic, inert, hypo-allergenic** (i.e. nickel) **jewellery**. Concerning **tattoos**, particular attention must be paid to **inks and single-use materials**.

(see Chapter 15: MATERIALS: INKS, NEEDLES, MACHINES, “*Inks: chemistry and differences*”, and “*Inks: risks, supervision, labelling*” and “*Needles, cutters, tools and substances involved*” and Chapter 6: ENVIRONMENT HYGIENE, “*Products, Single-use/disposable*”);

B. RISK OF INFECTIONS

SKIN INFECTIONS

Human beings live on a planet rich in micro-organisms, however, only few of them settle on the skin surface. The skin has its own protection mechanisms to limit this settlement. Micro-organism survival depends on their ability to resist to such mechanisms. Normally, microbes live in harmony with their hosts but sometimes the colonization may cause an infection with clinical and pathological evidence.

The skin is composed of 3 different kinds of zones, with a specific micro-environment and bacteria flora each:

1. armpit, perineum and interdigital spaces;
2. hand, face and torso;
3. higher part of arms and legs.

Partially occluded areas or less ventilated parts host many more micro-organisms. This is due to a higher quantity of humidity, the body temperature and the concentration of lipid skin.

Skin infections can affect anyone at any stage of life. The risk increases when the skin modifies its own integrity.

Every **skin lesion** (cut, burn, insect bite) can create an **open door** for **micro-organisms**.

Tattoos and pmu can create an **entry door** and so cause an infection.

Example of **skin infections**:

- **viral infections**: Molluscum Contagiosum, flat warts, vulgar warts, condylomas, herpes simplex virus, Pytiriasis rosea;
- **bacterial infections**: caused by Streptococcus and/or Staphylococcus i.e. impetigo, erisipela, folliculitis.

People affected by determined disease conditions are more vulnerable towards bacterial skin infections (e.g. diabetes, obesity, HIV).

INFECTED BLOOD-RELATED INFECTIONS: VIRAL HEPATITIS

In the **tattoo** and **pmu** process, due to the needle and pigment penetration into the skin and to the proximity of blood lymphatic vessels, there is the **possibility of infectious diseases transmission via blood** (or other biological materials).

The risk of infection depends on many factors and among the most important ones we can find the adoption of hygiene measures by the operator. Blood-borne infections are less frequent than it used to be, given that many treatments are conducted by professionals working in safe environments (from an hygienic perspective) and using adequate products.

If the equipment used to carry out the treatment is contaminated by infected blood, you can be affected by serious blood-borne diseases, for instance:

- hepatitis B
- hepatitis C
- HIV.

Transmission paths of blood-borne **infections** can be divided into:

- **apparent parenteral route:** transmission of an existing virus in the blood (or in other biological materials) of an infected subject to a “receiving” person (host) through:
 - › needles;
 - › cutters;
 - › blood squirts coming into contact with the nose, eyes or mouth of an operator;
- **inapparent parenteral route:** transmission of an existing virus in the blood (or in other biological materials) of an infected subject to a “receiving” person “through skin or invisible mucosa micro lesions” i.e. those provoked by a razor;
- **dry blood in the environment:** some viruses can resist these conditions for several hours or even days and infect a subject who comes into contact with the contaminated object. **The survival period in the environment and the associated risk of infection is:**
 - › at least **7 days for hepatitis B**;
 - › at least 16 hours (but not more than **4 days**) **for hepatitis C**;
 - › **few hours for HIV** (the risk of transmission from the environment is virtually nil).

The **probability of transmission** depends on the quantity of infective particles transmitted, themselves depending on these **factors**:

- concentration of virus in the blood;
- quantity of blood;
- route of contact (mucosa, through the skin);
- depth of the needle.

The risk of viral transmission **by a single infected needle** is:

- 5-30% for hepatitis B;
- 3-7% for hepatitis C;
- 0,2-0,4% for HIV.

Considering the recent developments in the tattoo and piercing field, it is worth considering the **risks**, particularly of the **transmission of viral hepatitis** related to **tattoo - piercing - pmu**.

Before moving forward, you need to know the following **scientific bodies and supervision systems**:

- **SEIEVA (Integrated Epidemiological System of Acute Viral Hepatitis)** is a supervision system created to collect data from the national territory and to measure the frequency of acute viral hepatitis and of risk factors, established by the Italian National Institute of Health in 1985;
- **CNESPS** is the **National Centre for Epidemiology, Surveillance and Health Promotion** belonging to the Italian National Institute of Health. It collects all the notification sheets about acute viral hepatitis from the different Local Health Service venues. The national surveillance covers around 70% of the population;
- **WHO (World Health Organization)**;
- **ECDC (European Center for Disease Control and Prevention)**;
- **PENV (National Plan for the fight against viral hepatitis)** promoted by The Ministry of Health.

Based on recent studies, **there is a close relation between piercing - tattoo - pmu practices and virus transmission, especially hepatitis B and C (HBV and HCV).**

The transmission of hepatitis B (HBV) and hepatitis C (HCV) virus can occur through:

- contact with infected blood: those who work in contact with blood (needles or cutters), drug users (used needles exchange), or during transfusion (especially in developing countries);
- sexual transmission;
- mother-to-child transmission at birth;
- among members of the same family;
- **aesthetic treatments: piercing, tattoos and pmu.**

HEPATITIS C

Aesthetic treatments with percutaneous exposition are **responsible for 10% of hepatitis C** cases.

Data collected by SEIEVA to estimate the number of **acute hepatitis C cases** associated to **aesthetic treatments** reveal that **piercings and tattoos** are strictly **connected** with the onset of this infection:

- **tattoos 6%;**
- **piercings 4%.**

So, the **piercing** is an aesthetic treatment that, alongside with the **tattoo**, can be

associated to the onset of **acute hepatitis C**. However, these surveys suggest that **also pmu can be included among the results**, although specific data have not been collected yet.

HEPATITIS B

Aesthetic treatments (tattoos, piercing, manicure, barber) constitute **risk factors** also for the onset of **hepatitis B**.

Acute hepatitis B cases attributable to specific **aesthetic treatments** according to SEIEVA data include:

- **1% tattoos;**
- **1.2% piercing;**
- 1.4% manicure;
- 11% shaving.

Shaving is the aesthetic treatment presenting the highest percentage of attribution of the acute hepatitis B onset.

Aesthetic treatments with percutaneous exposition **are a risk factor associated with acute hepatitis C and B** (SEIEVA) and more specifically **tattoos and piercings** (ECDC).

Data show that **the risk of infection does exist**, therefore **we need to work on safety conditions**.

The only potential existence of the risk infection through infected blood obliges us to implement all procedures with the maximum safety level.

[\(see also Chapter 2: MICRO-ORGANISMS, VIRUSES, VIRAL HEPATITIS\).](#)

C. **ALLERGIC REACTIONS**

Literature about immunological reactions can be useful to determine a condition of relative risk. It is crucial to **ask for the health condition of the customer** before the treatment.

Allergic reactions are caused by defense system alterations, determining overreactions to certain substances (allergens).

There are different **forms** of **allergic dermatitis**:

- **irritant contact dermatitis (ICD);**
- **atopic dermatitis (AD);**

- **allergic contact dermatitis (ACD)**: inflammatory process at skin level caused by a delayed hypersensitivity reaction after coming into contact with exogenous agents. It goes through a first **sensitization stage**, in which the first contact with the tattoo pigment does not provoke any visible reaction, but it activates the immune system to create **memory cells**; followed by a **memory response**: the second contact with the allergen triggers the reaction. The most commonly used allergens in aesthetics are: nickel, chromium, cobalt, preservatives, p-Phenylenediamine (PPD). The ACD may arise:
 - › in an acute form: erythema, oedema and superficial serous-filled vesicles;
 - › in a subacute form: desquamation and superficial scab-formation;
 - › chronic form: infiltrated plaques hyperkeratosis and lichenification, often associated to rhagades.
 Main symptoms are itch together with rash and burning sensation (typical reaction to nickel);
- **urticaria**: intense itch accompanied by the sudden onset of itchy wheals, that rapidly disappear and are caused by the vasodilatation and the oedema of the superficial skin. A wheal has 3 features: a 1) red, 2) rounded, 3) swollen mark of variable size. It always appears together with an itchy or burning sensation; it is always temporary since it completely regresses within 1-24 hours;
- **urticaria angioedema syndrome**. The angioedema is a sudden and pronounced swelling of the lower layer of skin, the tissue under the skin and mucous membranes. It can be painful rather than itchy. The recovery is slower and may take 72 hours long.

Most common **Allergens** involved in these procedures are:

- **metals**: nickel sulphate. The sensitisation to nickel sulphate, the most frequent contact allergen, is also due to continuous contact between the skin and this metal. Other metals can be: chromium, cobalt, iron, manganese, palladium, silver, gold, platinum. **Choosing the right metal for piercings** is fundamental against allergic risks. Inert metals such **titanium oxide** should be **preferred**. As regards **tattoos**, you should pay **attention** to **inks** and the **needle**;
- **disinfectants**;
- **latex**.

Before having a tattoo - piercing - pmu done, suggest to people suffering from allergies to consult a clinician and do a **Patch Test**. Always attach the copy of the result to the customer file, to show that there has not been any adverse customer

reaction to a product up to date. These are the two most used types of Patch Test in Italy for tattoos - piercings - pmu:

- **PATCH TEST** standard by **SIDAPA (Italian Society of Allergic Professional and Environmental Dermatology)** for:
potassium dichromate, rosin, epoxy, formaldehyde resin, euxyl k400, neomycin sulphate, fragrance mix, **nickel sulphate**, mercaptobenzothiazole, **para-phenylenediamine**, cobalt chloride, balsam of peru, latex, benzocaine, lanae alcohols, parabens, **petroleum jelly**, textile dye allergy, hydroquinone;
- **PATCH TEST** specific for **metals (by F.I.R.M.A.)** for:
titanium IV, gold, zirconium, aluminum, arsenic, palladium, molybdenum, copper sulphate, selenium, quicksilver, sulphur, manganese, **nickel sulphate**, vanadium, tin, platinum, cadmium, cobalt chloride, lead.

D. **SCARS (ATROPHIC, HYPERTROPHIC, KELOIDS)**

Scar is a tissue formation process to repair a wound on the dermis. After having a tattoo - piercing - pmu done, some implications may arise during the recovery period in the involved area.

Scars can be classified as:

- **Normal scar:** the healing process is limited to the wound itself. It is smooth, clear (hypopigmented), lacks of skin annexes (hairs, sebaceous and sweat glands) given its fibrous nature;
- **Atrophic scar:** low-quality repairing, with distanced margins. At first, there is the high risk of re-opening after traumas or tractions. It can be caused by a genetic disorder too.
- **Hypertrophic scar:** typically in the joint areas, it is an overproduction of fibrous tissue that can result in raised lump, sometimes painful. It can limit joint movement, but it never outgrows the margins.
- **Keloid scar:** keloids result from an overproduction of collagen in the recovery process. The scar outgrows its margins for unknown reasons, even if an individual and anatomic predisposition does exist (most common on shoulders and chest). It can onset also after insignificant traumas.

Customers who tend to develop **keloids** after different traumas **must not be tattooed**.

(see also Chapter 8: **THE TREATMENT, the healing**).

E. INFLAMMATORY REACTIONS

Immediately after the making of a **tattoo**, an **acute inflammatory reaction** will appear, due to the multiple intradermal injection of pigments. Usually, such a reaction lasts 1-2 weeks and it is considered normal. The operator must inform the customer in advance and give to him/her all the recovery rules to be followed at home.

Unfortunately, also **late reactions** are possible, weeks or years later. Their classification is difficult and a definite framework of tissue reaction has not been drafted yet.

F. HYPO- AND HYPER-PIGMENTATION

This is an alteration of the normal pigmentation, resulting in a darker or clearer colour of the skin in some areas of the body. It is caused by a lack or over-production of melanin at the basal layer of the epidermis and when it migrated to the most superficial layer, it generates dark or clear marks.

When tattooing a person affected by this alteration, my advice is to warn the customer of the possibility that the pigmentation may be triggered by the skin, creating “marks”. I suggest **not to tattoo** body parts with hypo-pigmentation.

G. FOREIGN BODY GRANULOMAS

Onset of nodules around the injected material, perceived as foreign body.

Over the last years, many cases of tattoo and pmu-related cases have occurred because of the use of hazardous substances (also by clinician, i.e. the filler or tattooist/piercer, i.e. pigments).

In my experience, also changing medical practice or product may lead to allergic reactions and granulomas (i.e. lips area) and may force me to interrupt any treatment.

Do not tattoo on granulomas.

Operators often buy pigments online, ignoring buying just “imitations”. Please, buy only **qualified products from qualified companies**: safety is crucial for customers health! If you buy safe products, you will be protected against any such possible harm (i.e. granulomas or allergic reactions) and also with a clear conscience.

H. COMPLICATIONS AFTER NUCLEAR MAGNETIC RESONANCE (NMR)

As everybody knows, radiography and magnetic resonance emanate waves on the body and, according to how it responds, images are generated. Unfortunately, these waves stimulate metal to such a point that it becomes incandescent and this may provoke redness, burns on tattooed surface, because of the metal oxide contained in tattoo and pmu ink.

In addition to this, the radiography result may be compromised by the colour itself, creating undesired contrasts and making analyses unreadable. Today the majority of inks contain safe substances, but you will never know how will they react during a NMR; old tattoos constitute the main problem, when less controlled iron-based materials were used. In any case, it is still difficult to determine the quantity of metals inside inks and qualification released by tattooists are not accepted by doctors, since they are not issued by medical staff.

Nowadays NMR machines are new and more sophisticated, with a higher magnetic field, and here again the risk of complications increases.

What's more, inks have a screening effect hiding the underlying layer, hence compromising diagnosis.

Suggest to tattooed people in need of diagnostic analyses to immediately contact the doctor, the radiologist, so a clinician can adapt to the single case.

These are the reasons why is so important to **explain** to your costumer at the **informed consent** stage.

I want to reassure you: lately I have undergone NMR three times on my face with the up-to-date machines, and I have been "wearing" eyebrows, eyes and lips PMU for 25 years. No problem at all.

But you, as operators, need to always inform your costumers of the risks.

In case of a customer in need of **pmu on the areola** after aesthetic surgery intervention (e.g. breast enlargement or reduction), I suggest to ask for a **written medical opinion** as authorization to treat a woman who has undergone a mastectomy. Moreover, it is better to use more **transparent inks, contained in single-use sterile packages**. As for oncologic patients who may undergo NMR more frequently, I advise you to behave as professionally, competently and seriously as possible, using safe products only.

Recommendations for operators

Metal-based pigments may invalidate future X-ray and NMR images, and future access to NMR may be prohibited to avoid possible side effects.

CONTRAINDICATIONS AND CORRECT INFORMATION

BEFORE EXECUTING A TATTOO - PIERCING - PMU

According to what I have said so far, it is really important to know the risks, **customer health conditions**, the conditions that may provoke **contraindications** and to **correctly inform the customer**.

Inform your customer about the general **health** state:

- predisposition or previous allergies;
- photosensitivity;
- serious diseases such as: diabetes, immune deficiency or allergic or infectious or coagulation diseases.

Do not apply tattoos - piercings - pmu to people suffering from:

- diabetes;
- immune deficiency;
- skin tissue diseases;
- endocardium;
- haemophilia or coagulation diseases;
- allergy (particularly to metals and phenylenediamine);
- infectious diseases: hepatitis B and C, HIV;
- prolonged therapy with cortisone based drugs;
- anticoagulation therapy.

Carefully assess the **dermis** state, paying attention to:

- wounds;
- eczemas;
- urticarial;
- previous or ongoing skin diseases.

Do not apply tattoos - piercings - pmu on damaged or red skin in presence of:

- **elementary lesions:**
 - › erythema;
 - › papula;
 - › desquamation;
 - › vesicle;
 - › blister;
 - › pustule;

- › scab;
- › mark;
- **pre-existing lesions:**
 - › local skin conditions:
 - » haangiomas;
 - » nevi (moles);
 - » infections;
 - › diffuse skin conditions:
 - » psoriasis (chronic and relapsing dermatosis, with silvery scaly-skin);
 - » lichen;
 - » urticaria;
 - » vitiligo (chronic and genetic diseases of the immune system characterised by a lack or a reduced quantity of melanocytes - the melanin producers);
- dermis tending to form **keloids**.

When in doubt, if you do not know the condition affecting your costumer, suggest to him/her a dermatological visit and collect as many data as possible to attach it the his/her file (to be able to proceed safely with the treatment).

Be sure that your customer understands all possible risks.

The operator of tattoos - piercings - pmu must be able to recognize skin conditions that may lead to side effects and that require more attention before, during and after the work.

Do not apply any tattoo in case of **adverse side effects** such as: systemic illnesses (immune system deficiency, coagulation conditions, tissue illnesses) and chronic dermatosis (chronic urticarial, severe psoriasis, bullous illnesses, severe atopic dermatitis, auto-immune diseases).

By correctly informing your costumer, take into consideration **side effects related** to an acute dermatosis, before tattooing it:

- impetigo (caused by Staphylococcus aureus and Streptococcus bacteria);
- herpes zoster and herpes simplex;
- ongoing mycosis;
- severe seborrheica dermatitis;
- allergic and irritative dermatitis;
- atopic dermatitis;
- severe acne.

IN CASE OF HERPES SIMPLEX

Customers suffering from **herpes simplex** may be advised to undergo a preventive therapy prescribed by the GP. Under psychophysical stress or after traumas (as for dermal-pigmentation) the virus can reactivate and therefore complicate the recovery, spoiling the result.

To avoid this, it is advisable to inform customers that 1-2 sessions more of retouching can be worthwhile for an optimal longlasting result, keeping in mind that new blisters may provoke the fading out of the tattoo.

(see also Chapter 2: MICRO-ORGANISMS, Examples of virus infections, herpes Simplex).

IN CASE OF SEBORRHEICA DERMATITIS

Seborrheica dermatitis can be associated with:

- sebum overproduction;
- fungal mycotic proliferation of *Malassezia* type (present in everybody's skin).

The fungus eats sebum and proliferates causing cell irritation, that appears as an accelerated proliferation and cell turnover.

Customers suffering from this disease must be warned that the higher rate of skin exfoliation may compromise the final result. The recovery may be compromised too and over time the dermatitis may provoke the fading out of the inks.

IN CASE OF ALOPECIA AREATA

Non-scarring alopecia is an autoimmune disease in which hair is lost on some spots, with rare or no inflammations and appearance of totally or partly bald patches. Skin spots are regular, smooth and slightly pinkish or pale. It may evolve into **total forms** (baldness) or **universal forms** involving eyebrows, eyelashes and body hairs. It follows an irregular trend (3 months - 3 years duration). This disease fails to protect the organism against viruses and bacteria and wrongly attacks the follicles, namely those vase-like structures where hair and hairs grow everywhere on our body.

Advise your customer **not to have the treatment done** during the **acute stage** of the disease, since the pigment may be automatically eliminated by the immune system or may generate inflammations. **You can apply the treatments on steady conditions** only, without progression of the disease for at least **two years**.

The best would be to do a **skin test** before the treatment, because dermal-pigmentation in **auto-immune diseases** may cause **Koebner phenomenon** also called **Reactive Isomorphism**. This is characterised by lesions typical of trauma-related dermatosis, i.e. psoriasis, lichen, vitiligo, and can appear on any skin surface subdued to a mechanical input.

If you want to treat a customer with one of these conditions, I suggest you to ask for a **written consent** of his/her GP.

The immune system usually protects our body from external influences, but sometimes it malfunctions against foreign bodies (pigment) inside the organism.

Do not apply tattoos - piercings - pmu on damaged skin or presenting conditions. In that case a customer should be visited by a doctor (a general practitioner should always be the first reference for specialist examinations prescriptions) and only then you are able to safeguard his/her health with satisfying results.

We all know that the customer is asking to solve an aesthetic problem, but you will be able to help him/her only after some medical tests. Once you have explained this and done your best during the treatment, I am sure you will be both happy with your work.

IN CASE OF NEVI (MOLES)

In case of **nevi** (pigmented benign lesions of the skin that may be congenital or acquired) when executing tattoos - piercings - pmu, keep **appropriate distance** from them, so that dermatologists will be able to monitor them. Unfortunately, melanomas are a kind of skin cancer which is very common and serious and often, at early stages, is difficult to detect. Hence is important to keep nevi well surrounded by a natural skin area.

IN CASE OF CHEMOTHERAPY

In case of chemotherapy tattoos - piercings - pmu should be avoided. However, it is possibly to intervene during a pause between two cycles, after the consultation of the treating doctor and with written authorization. You can apply the work at the end of the cycles, after the oncologist approval. The perfect moment would be before beginning chemo, even if the psychological stress is very high and may not help skin recovery.

Chemotherapy causes a decrease in immune defences, so the skin will be more vulnerable to infections leading also to serious consequences: you would need to consider all these factors when it is time to accept such a job. Benefits of pmu (breast, eyebrows, eyes) for an oncology patient are many: it helps self-acceptation, and reintegration to social life. Your work as a camouflage make-up artist can be determining. You need to be as professional and experiences as possible.

When it comes to applying **tattoos - pmu**, you should use **specific materials**:

- choose among **sterile, atoxic** and producer **certified pigments** only;
- **be careful** with **pigments with aromatic amines**, considered unsafe materials. You can find dedicated **charts** (in Italy and Europe) reporting the materials that are in compliance with norms, including all percentages of ResAp (2008)¹.

The topic of colours and the related norms will be addressed later on in this document.

[\[see also Chapter 15: MATERIAL USED: INKS, NEEDLES, MACHINES, *inks: chemicals and characteristics and inks: risks, controls-supervision, labelling*\].](#)

Regarding **materials** for **piercings**, you should:

- use adequate jewellery with **no designs, scratches or irregular surfaces**;
- prefer **materials** such as: **Niobium, Titanium, Platinum, dense and low-porosity plastic materials (nylon, acrylic, lucite)**;
- avoid **nickel sulphate**:
 - › the **EU Nickel Directive in 2001** set the maximum content and the nickel release from jewellery;
 - › **the quantity of nickel released by a metallic object per skin surface unit (quantity/cm²) is critical for allergy risks** (in Denmark the 1992 act establishes the limit of nickel release for metallic objects is 0.5 micrograms/cm²/week);
- **be careful with heavy metals!**

It is important to **inform** the costumer about:

- the material you use;
- the execution procedures;
- risks: allergies, infections, aesthetics, functionality.

We will talk about the disclosure later on this document.

[\[see also Chapter 14: SUPERVISION INFORMATION FOR THE USER, *the informed consent*\].](#)

Chapter 2

MICRO-ORGANISMS

Even if a bit technical and maybe complex, I think you need to know some basics. It is not necessary that you memorise all the complicated terms or the genetics of micro-organisms, but it is crucial for you to understand some concepts related to viral hepatitis and HIV.



A **micro-organism** is a biological agent able to provoke infections and intoxications.

Micro-organisms families fall into four categories:

- **bacteria** (together with favourable environmental conditions, e.g. some spore-forming bacteria give birth to special forms of resistance called **spores**);
- **mycetes** (fungi, moulds, yeasts);
- **protozoans**;
- **viruses**.

Micro-organisms can be classified as:

- **saprophytic** when their natural habitat is the environment. They live and multiply on dead organic matter (animal or vegetal) in decomposition, which is their food. They are widespread in the environment (water, soil) and their function is fundamental in the organic cycle;
- **parasites** when they attack the host and damage the larger organism. They can only live on living organisms, eating cells, tissue or organic materials of the host itself. Not every parasite is hazardous for the host organism. Three are the possible interactions between parasite and host: commensalism, symbiosis and pathogen. They can be:
 - › **commensal** when they cohabit with the larger organism without benefits nor damages. The term commensal which means: who eats at the same table with you. Such parasites find the nutrients they need to live and reproduce in the same organism where they live, without damaging it;
 - › **symbiont**: in the symbiosis both the parasite and the host take advantage of the cohabitation, for instance, some bacteria living in the intestine find their ideal life here, but they play a useful role for the host too;
 - › **pathogens** can damage in a more or less serious way the host in which they live and reproduce, even in a healthy organism.

The **Metabolism** of micro-organisms works with:

1. oxygen: micro-organisms can be divided into:
 - › aerobic, which can live only in presence of oxygen (yeasts, moulds and some bacteria);
 - › anaerobic, which can live only in absence of oxygen (some protozoans);
 - › who can live with or without oxygen;
2. temperature: a highly influencing factor in the multiplication. **The detention of bacterial multiplication goes from 0°C to 121°C, which is why the safest sterilisation is into an autoclave at 121°C for 20 minutes;**
3. PH: the majority of bacteria develop better around a neutral PH (6.5-7.5), whilst moulds in acid environments (PH 5). Critical PH levels for micro-organisms growth is < 4.5 and >9;
4. water: necessary for every organism; it is called “free water” when considering only the water available for the metabolism;
5. absence of light: bacteria and moulds grow faster in the dark, even if it is not indispensable. UV rays are sterilising.

According to **the way** bacteria **look for energy**, they can be divided into:

- autotrophic: autonomously producing the nutrients they need, they feed on inorganic simple substances and are able to process organic substances;
- heterotrophic: they use organic compounds coming from the external environment and processed by other organisms.

An efficient transmission depends on many **factors**:

- the infecting agent source;
- the number of released organisms;
- the ability of the micro-organism to stay strong and survive in the environment;
- the frequency of real contacts;
- the susceptibilities and the immune state of the population.

In order to be protected from micro-organism attacks, it is important to have the physical **skin and mucosae barriers** intact:

- keratinized layer;
- cellular desquamation;
- adequate hydration of the skin;
- acid PH;
- commensal flora;
- sebum;
- rinsing of the dermis.

The microbial flora living inside and on the surface of the human body **changes** constantly, due to **factors** such as:

- age;
- diet;
- hormonal state;
- health conditions;
- hygienic conditions;
- personal hygiene.

The skin hosts the microbial flora and quantities may vary according to the sebaceous and sweat glands activity. In addition to this, there can be: staphylococci, streptococci, mycetes, Gram+ and Gram- bacilli, candida, etc.

In the respiratory system (e.g. nose, mouth, pharynx) you can find staphylococci, streptococci, etc.

If **the equipment is contaminated by infectious blood**, the customer is exposed to a high risk of infection; the main transmissible pathogens in the **tattoo - piercing - pmu** practice can be considerably similar to those in the healthcare sector through **blood and other biological liquids: hepatitis B (HBV), hepatitis C (HCV), HIV**.

BACTERIA

Bacteria:

- are unicellular organisms sized between 0.3 – 1.5 micron;
- can grow and reproduce autonomously;
- find nutrients both in organic and inorganic substances; every biological matter is ideal to them (faeces, urine, sputum, blood, etc.)
- they multiply very rapidly by halving (around 1 million times per 8 hours): exponential growth;
- they are made up of 80% water and the most important life and growth are: nourishment, moisture, oxygen (aerobes);
- they are visible only under microscope by means of particular colouring (Gram staining);
- **some bacteria may evolve** (in particularly ideal survival conditions) **to spore** (sporogenous family) and survive for years;
- The majority of **bacteria is sensitive to heat already at 60°C**;
- **spores are only destroyed by temperatures higher than 120°C**;
- are **sensitive to disinfectants**;
- are **sensitive to antibiotics**.

The bacterial cell:

- is prokaryotic, it lacks of nuclear membrane;
- it has ribosomes, other organelles and cytoplasmic inclusions;
- genetic material is composed by DNA (1 circular chromosome);
- has a cell membrane and a cell-wall.

Bacteria are classified according to:

- **morphology:**
 - › cocci, round shaped;
 - › bacilli, cylinder shaped;
 - › vibrios, curve shaped;
 - › spirilla, spiral shaped;

- and according to **the way they aggregate**:
 - › diplococci, typically in the form of two joined cells, tetrads in group of four, sarcina by eight;
 - › streptococci, chain shaped;
 - › staphylococci, cluster shaped.

A particular colouring, called Gram staining, allows to split bacteria into two big groups:

- Gram-positive (Gram +) that become violet when in contact with different colourings. Cocci (staphylococci, streptococci), spore-forming bacilli (clostridium - tetanus), non-spore-forming bacilli (lactobacilli), etc.;
- Gram-negative (Gram -) become reddish instead. Cocci (neisseria - meningococcus), bacilli (pseudomonas), etc.

The different colouring is related with the different thickness and chemical composition of the cell-wall.

Structure of the bacterial cell

Bacterial cells are composed by a particular structure for every kind of bacteria and an optional structure, just as in some bacterial species:

- constrained structures: cell wall, cytoplasmic membrane, cytoplasm, nucleus;
- optional structures: capsule, flagella, fimbria, spores.

Bacteria reproduce themselves through **binary fission**, they are unicellular micro-organisms of small size (micron).

Spores and bacterial toxins reproduction:

- in adverse environmental conditions, some bacteria (sporogenous family) give birth to special forms of resistance: **spores**;
- in favourable environmental conditions, spores germinate and bacteria reactivate their metabolism;
- some bacteria create toxic substances: **toxins**.

Spores are not able to reproduce, they are inert, they are like “dormant” germs waiting for “better times”, in other words favourable environmental conditions. Spores will be able to germinate again, namely, to come back to their vital shape, when they will find a new favourable environment. spore-forming bacteria, given their high resistance, represent a big problem for environment and material disinfection and sterilisation. They can survive the drying process, to heat action, to UV radiations and to disinfectants.

“Clostridium Tetani” is an aerobic sporogenous germ responsible for **tetanus**. You can find its spores in the soil and they can penetrate into our organism if we hurt ourselves. Here spores can find the perfect conditions to reactivate their life cycle by producing a strong toxic substance (**toxin**) responsible for this serious illness. To prevent this, clean accurately the wound using **hydrogen peroxide**: tetanus clostride is anaerobic and is **killed by oxygen**.

Pathogens that penetrate the organism, can damage organs they settle in and induce illness, fever, etc. due to the same bacteria reproduction or toxins production. Bacteria can be eliminated using **disinfectants**. Disinfectants, however, are for external use only and cannot be digested.

To kill bacteria reproducing on our tissues, antibiotics are used and strictly under medical prescription.

The most common skin infections are: **folliculitis, impetigo and acne**. They are caused by two groups of **bacteria: staphylococci and streptococci**.

FUNGI OR MYCETES

Fungi, also known as mycetes, represent a ubiquitous and varied group of organisms. Some of them can cause illnesses in humans and animals and they are generally referred to as mycosis. Some can modify food, others are used for bread processing (yeasts) or in wine and beer production, let's not forget that antibiotics come from moulds (penicillin).

Fungi or mycetes:

- are eukaryotic, uni or multicellular organisms;
- have a firm cell wall.

According to the **morphology** they can be distinguished in:

- **moulds**, multicellular;
- **yeasts**, unicellular;
- **dimorphic fungi**, that can look like moulds or yeasts according to the environmental characteristics.

Fungi can be saprophytic if they eat decomposed materials, symbiont if they cohabit with other organisms with mutual benefits or parasites when they live on or in the host.

Fungi are living beings: aerobes.

Infections caused by **fungi** are called **mycosis**.

Usually, mycetes are harmless and live on skin and on mucosae, but sometimes they may provoke infections if the organism is particularly weak. Some skin mycoses can be transmitted through skin with or infected objects and garments (towels, combs, footboards...).

Fungi may lead to the development of different illnesses.

Superficial mycosis: on the skin, skin annexes and mucosae.

Deep mycosis: localized infections in deep organs or systemic infections.

Main kinds of mycosis are: **pityriasis, tinea, candida** (oral and genital).

PROTOZOANS

Protozoans are:

- unicellular micro-organisms with a very complex structure in comparison to bacteria and mycetes;
- able to move independently thanks to the presence of movement organs (flagella, long cytoplasmatic filaments; fimbriae, shorter filaments, pseudopodia; cytoplasmatic projection which is typical of amoeba);
- when they are in adverse environmental conditions, give birth to forms of resistance also known as cysts, in order to survive.

They can be pathogens for human beings: e.g. malaria and toxoplasmosis; they provoke gastrointestinal and urogenital infections.

VIRUSES

Viruses:

- are very small particles. The measure unit is the nanometre or millimicron (1 micron = 1 thousandth of a millimetre; 1 millimicron = 1 thousandth a micron). Their diameter varies from 20 to 300 nanometers, they are visible only under electron microscope;
- do not have typical life features;
- need living beings for their reproduction;
- are affected by conditions such as environment, temperature, humidity, sunlight;
- are antibiotics resistant.

Structure

Viruses are made up of:

- nucleic acid: DNA or RNA (but not both);
- the capsid: a protein that protects the nucleic acid;
- the viral envelope: a protective coat around some viruses.

Virus reproduction can be simplified as follows:

- attachment: the virus binds to the cell surface and attacks the cell membrane of the host cell;
- penetration: the viral genome (DNA or RNA) enters the host cell;
- uncoating: the release of the viral genome and of the proteic capsule;
- replication: inside the infected cell, the virus creates macromolecules in order to multiply. The new copies of the virus in turn reproduce;
- release: new viruses break the cell membrane and spread in the external environment. The new viruses can be released one by one through exocytosis, without destroying the cell, or can also be released all together by lysis, in other words after the host cell dies. New viral cells will be ready to infect other cells.

Regarding humans, some viruses may lead to infections after the penetration.

Here is a list of the main viruses: **viruses of parainfluenza, flu, hepatitis A, B, C, D, E, acquired immunodeficiency (HIV), rabies, measles, smallpox, polio, chickenpox, etc.**

EXAMPLES OF VIRAL INFECTIONS

HERPES

HERPES SIMPLEX

Herpes simplex infection appears with blisters at skin level.

There are two types of virus, HSV-1 and HSV-2:

- › the virus HSV-1 commonly causes labial herpes;
- › HSV-2 virus usually causes genital herpes.

The starting point of herpes infection is almost unknown. After the initial rash, the **virus stays latent within the nervous ganglia**. Recurring rashes can be triggered by an over-exposition to sunlight, feverish diseases, physical or emotional stress,

immune suppression. The triggering input is often unknown. Normally, lesions appear somewhere on the skin or mucosa but more frequently around the mouth, on the lips, on the conjunctiva, on the cornea or on the genitals. After a first period of burning sensation or itch, small blisters appear on an erythema. Lesions on nose, ears and fingers may be particularly painful. The blisters last a few days, then dry out and form a thin yellowish scab. They heal over 8-12 days after the onset. Single herpes lesions heal completely but recurring lesions on the same area may provoke dermatrophy and scars.

Should AIDS patients contract herpes infections, they may face serious consequences.

Herpes therapy consists of taking **specific drugs** (only after **medical prescription**). **An active infection on the lips constitutes an adverse side effect to pmu** on that area, which therefore must be postponed until after complete healing.

You should advise a customer suffering of recurring episodes of **herpes simplex** to opt **for a pre-treatment therapy** prescribed by their doctor before having **pmu on the lips** applied.



HERPES ZOSTER OR SHINGLES

Herpes zoster also called **shingles**, is a viral illness caused by the reactivation of chickenpox virus. It is visible at the nerve endings and on the skin. Usually, blisters appear on the torso together with pain and itch.

An active infection represents a side effect for the tattoo/pmu application. It will be possible only after the complete healing of the customer, who may also ask for advice to his/her GP about timing and side effects.

VIRAL HEPATITIS

Viral hepatitis are infections of the liver that, even if clinically similar, differ among each other for ethology (different viruses may lead to the infection) and for epidemiology (different distribution, higher risk of infection and illness).

Here is a list of the **5 types of viral hepatitis** provoked by the most common hepatitis viruses:

- hepatitis A;
- hepatitis B;
- hepatitis C;
- hepatitis D;
- hepatitis E.

According to the **World Health Organization (WHO)** in 2014 viral hepatitis were among the major public health issues at a global level.



VIRAL HEPATITIS IN THE **WORLD** (latest data of Italian National Institute of Health of 2014 in short, published in 2017):

- **hepatitis A:**
 - › it has been estimated that **every year 1.4 MILLION** of hepatitis A **cases** (HAV);
 - › the transmission is faeces-oral through contaminated food and water or by direct contact with an infected person;
 - › anti-HAV vaccination is the most effective preventive measure;
- **hepatitis B:**
 - › around **240 MILLION chronic carriers are suffering** from hepatitis B (HBV);
 - › the WHO estimates around **780 THOUSAND people dying every year** because of HBV consequences;
 - › vaccination is the most effective preventive measure;
- **hepatitis C:**
 - › around **130-150 MILLION people** are hepatitis C virus **chronic carriers**;
 - › between **300 and 500 THOUSAND people die yearly** as the result of hepatitis-related illnesses;
 - › a vaccination to prevent hepatitis C does not exist;
- **hepatitis E:**
 - › around **20 MILION people every year contract** hepatitis E;
 - › more than **56 THOUSAND people die yearly** of fulminant hepatitis.

HEPATITIS **B** AND HEPATITIS **C** IN **EUROPE** (ECDC 2010)

34 Countries, 27 UE + 7 BORDERING COUNTRIES.

In the Mediterranean region, the number of people infected by hepatitis B and C is relevant, with a higher concentration in:

- EU Middle and Southern countries;
- Bordering countries: Turkey, Romania, Bulgaria, Greece.

HEPATITIS **C** IN **ITALY**

(PNEV 2015)

Italy has the highest incidence of hepatitis C (HCV) and the highest number of **infected subjects**: around **1 800 000 people suffering from chronic hepatitis C**. 60% of them is older than 65 years old. The highest incidence is in Southern Italy and on the Italian islands.

New acute infections incidence amounts to **120 cases per year** (SEIEVA 2014). The majority of new acute infections affect men aged between 15 and 24 years.

HEPATITIS B IN ITALY

(PNEV 2015)

Around **500 000 Italians** are affected by **chronic hepatitis B**.

New acute infections Incidence amounts to **540 cases per year** (SEIEVA 2014).

The majority of new acute infections affect people older than 30 who are not vaccinated.

Vaccination is compulsory since 1991 for age groups from 0 to 12 years.

HEPATITIS A

Hepatitis A is an acute infective disease caused by a virus attacking and damaging the RNA liver cells. The transmission is mainly faeces-oral but it does not become chronic.

It is globally widespread, both under sporadic and epidemic form, with a highest incidence rate in countries with poor hygienic conditions. The course of the illness is almost always positive.

In Italy the illness is endemic, especially in Southern regions, where eating raw seafood is a common habit. However, epidemic and sporadic cases may occur elsewhere in the country, due also to contaminated food (seafood, fruit and vegetables) or water.

Preventive vaccination consists of an intra-muscular injection.

HEPATITIS B

Hepatitis B is an infective illness caused by the **HBV virus**, a DNA virus, that attacks the liver. It is transmitted via blood contact from mother-to-child at birth or during pregnancy.

Viral hepatitis B, after an **incubation period** ranging from 60 to 90 days, can become visible when the clinical picture is already serious. Normally, first visible symptoms are: inappetence, general ill feeling, fever, nausea, vomit, headache, abdominal pain. It can come together with icterus, namely the yellowish colour of the skin and of the scleras, due to the overconcentration of bilirubin in the blood and to the low liver functioning. In some cases, the illness becomes chronic with severe long-term consequences (active chronic hepatitis, hepatic cirrhosis, liver cancer).

Preventing hepatitis B is possible through vaccination, available and compulsory for the entire population. Hepatitis B infection represent **an occupational risk** for medical and paramedical staff (and **tattooists and piercers**), **since during their work they may well enter into contact with blood and body fluids**, for this reason they shall be **vaccinated**.

The HBV virus contained in blood outside the body **survives** up to **7 days** on **surfaces** at room temperature.

Viral hepatitis B is one of the most infective viruses in the world, and it does not always appear with typical symptoms as described above and has **an invisible cycle**.

(see also later in this chapter, next paragraph “vaccines” and chapter 5: OPERATOR HYGIENE, Handling accidents in case of accidental wounding by a contaminated needle or sharp).

HEPATITIS C

Hepatitis C is an infective illness of the liver of the RNA (HCV), caused by a virus. It is transmitted via blood contact from mother-to-child at birth or during the pregnancy.

The clinical picture of the illness is similar to hepatitis B, with a higher possibility to become chronic or to be fulminant. It appears only after an incubation period. In a high percentage of the cases, the acute infection becomes **chronic** and evolves into a longstanding illness and/or leads to **cirrhosis** and then degenerates into liver failure and **liver cancer** (hepatocellular carcinoma).

The origins of this infection is human, whether infected or carrier.

Every medical and paramedical operator (or people working in the same field), **tattooist and piercer** must consider these risks of infection.

The HCV virus is mainly transmitted through **infected blood** (e.g. intravenous drug use, non-sterile medical devices and blood transfusions) through sexual intercourse and **accidental percutaneous exposure**.

The risk of transmission of the infection with a needle, accounts for 2% (in between the HIV **transmission** risk of 0.3% and the **HBV of 30%**).

Data on “**external**” survival of **hepatitis C** are limited but range **from 48 to 72 hours (2-3 days) in the environment**.

The **incubation** period varies from **7 to 9 weeks** with an average of 20-70 days.

There is no vaccine for hepatitis C at the moment.

HEPATITIS D

Hepatitis delta (HDV) is a **defective** virus, in that the hepatitis B virus needs to infect in order to reproduce (simultaneous infection or super-infection of D virus in a chronic carrier of HBV with a new acute hepatitis).

Acute infection can evolve into chronic.

Follow the same transmissions routes and preventive measures as for hepatitis B.

HEPATITIS E

Hepatitis E is a liver infection caused by the HEV virus, it has been temporarily classified in the *Caliciviridae* family. Hepatitis E is an anicteric acute disease (with no icterus) and self-limiting, similar to hepatitis A. Rarely it can be fulminant. Fulminant forms are more frequent in pregnant women, especially in the third term, with a 20% death rate. Rarely, there have been chronic cases in immunocompromised subjects and cases of new acute episodes.

It is globally widespread, both in sporadic and epidemic form, with a highest incidence rate in countries with poor hygienic conditions. In developed countries, most cases affect people coming back from endemic countries, but also native cases are increasing. This form of hepatitis is rare in Italy.

Transmission occurs through **contaminated food, water, faeces**. The majority of outbreaks are concentrated in developing countries, due to contaminated drink water. The transmission from person to person is less frequent than in hepatitis A.

After an **asymptomatic incubation period** of **2-9 weeks, symptoms** similar to those of hepatitis A appear: fever, fatigue, abdominal pain, lack of appetite, nausea, vomit, dark urine, icterus.

Diagnose can be done through blood analysis and a stool test for the detection of specific HEV or HEV-RNA antibodies. Furthermore, liver enzymes can increase, ALT and GGT included, evidencing an inflammatory state or the damaged hepatic tissue.

Hepatitis E cases are typically self-limiting, and no hospitalization is required. There is no really effective therapy, so **prevention** is most important.

Individual **prevention** means respecting general personal **hygiene** rules, such as **washing one's hands accurately**.

HIV - HUMAN IMMUNODEFICIENCY VIRUS

Human immunodeficiency virus is the cause of acquired immunodeficiency syndrome (AIDS). HIV: infection; AIDS: disease.

Currently we know two kinds of HIV: HIV-1 worldwide spread; HIV-2 present just in some African countries (less strong than type 1).

HIV is a retrovirus that causes chronic infections which are barely sensitive to the immune response. They slowly and progressively evolve with a possible lethal result.

The incubation period varies from a few months to several years.

The symptoms of the last stages of the disease are: recurring pneumonias, herpes zoster and cancers, because it paralyses the immune system.

Approximately **34 MILLION PEOPLE**
are affected by HIV **WORLDWIDE (2010).**

In **ITALY** incidence amounts
to **5 for 100.000** inhabitants (2012).

HIV may be **transmitted through parenteral routes** (blood transfusion or infected blood products, 90% of risk), or by needle exchange (70% risk) among drug addicted, **with sexual relationships** hetero (1-2% risk) and homosexual (80% risk), through conjunctival route and from mother-to-child.

A risky behaviour can be:

- 80% sexual;
- 10% drug addiction;
- **10% parenteral route.**

Sufficient quantity of viruses (viral load) necessary to infect can be found in **body fluids** such as blood, semen, vaginal secretion and breast milk.

HIV does not survive **outside the body (2 hours)**.

There is no HIV vaccine.

There is no active immunoprophylaxis. Only **prevention** can work, avoiding risk behaviour and using condoms in case of occasional sexual relationships. Should you contract HIV, antiretroviral therapy is the only prevention against complications.

HIV is a retrovirus of the lentivirus type, that infects, destroys or paralyzes human immune system cells (lymphocytes CD4). As the infection evolves, the immune system weakens.

The progressive destruction of lymphocytes CD4 lead to an immunodeficiency that can appear in an opportunistic disease, such as cancers. After the asymptomatic stage, before the onset of typical AIDS illnesses, other alterations can occur referred to as **ARC (AIDS Related Complex)**: candida, fever with no cause, persistent diarrhoea, weight loss.

Patients who do not undergo antiretroviral therapy can live for 10-11 years and can be distinguished in the following stages: acute infection, chronic asymptomatic infection and symptomatic infection with the development of acquired immunodeficiency.

ART therapy (Antiretroviral Therapy) increases life expectancy significantly by making HIV a chronic disease.

Acute infection can evolve in an asymptomatic way. 50% of cases show very different and aspecific clinical pictures: similar to flu, mononucleosis, sore throat, fatigue, low grad fever, rash, oral ulcer, myalgia, pharyngitis, cephalgia, night sweat, etc.

OTHER TRANSMISSIBLE DISEASES

There are other transmissible diseases, in particular:

TUBERCULOSIS - TB:

- **caused by Mycobacterium or Koch Bacillus;**
- is an infection that may affect any organ or tissue, most frequently pulmonary;
- the most frequent transmission route is respiratory;
- the skin form prevails in wet and cold climatic regions and represents less than 1% of the TB infections;
- it affects mainly face, neck and limbs;
- usually **dissemination** occurs **through blood;**
- bacilli may reach the lower layer of the skin through **contaminated wounds, needles, tools.**

ATYPICAL MYCOBACTERIOSIS:

- there are different types of mycobacteria;
- the most important human skin illnesses are: *m. avium*, *m. marinum*, *m. kansasii*, *m. ulcerans*, *m. fortuitum*, *m. chelonae* e *m. haemophilum*;
- they usually generate **granuloma** and **ulcers**;
- **they can live in the soil, water, domestic animals, food**;
- **there is evidence of mycobacteria injection through tattoos**.

LEPROSY:

- less frequently;
- through bacilli penetration;
- visible symptoms after 2 to 5 years or even up to 12 years;
- destroys peripheral nerves causing insensitivity and mutilations.

SPOROTRICHOSIS:

- subcutaneous mycosis, associated with *sporothrix schenckii*;
- cosmopolitan, spread in tempered regions (Italy included);
- contamination route through **micro traumatisms and dust**;
- **there is evidence of contamination through tattoos** and on camping tourists.

WARTS:

- benign skin lesions due to **Papillomavirus**;
- ubiquitous infection, mostly on children and young people;
- transmission occurs **through contact or contaminated objects**;
- 3 weeks to 20 month incubation;
- variable clinical pictures:
 - > **ordinary wart**: back of the hands and periungual areas (wrinkled surface, 1-5 mm diameter);
 - > **flat wart**: small and smooth papule on face or knees;
 - > **filiform wart**: face.

Do not tattoo costumers when they have warts.

SCABIES:

- contagious dermatitis due to *sarcoptes scabiei*;
- transmission through personal contact or mediated by garments;
- 1-month incubation;
- symptoms: itch, erythematous papules eruption in s 5-10 mm long line, ending with blisters;

- it usually affects the flexor surface of wrists and interdigital spaces, of elastic surfaces limbs, armpits, belly button, breasts and genitals.

PEDICULOSIS:

Is a skin parasitic disease caused by **hematophagous insects** (bloodsucking) commonly known as **lice**, transmission occurs **through contact**.

There are **three types** of pediculosis caused by three species of lice:

- **pediculosis capitis** caused by *Pediculus humanus capitis*, 3 mm long and grey; concentrated on the scalp. The female lays the eggs sticking them to the hair shafts. These are white and around 1 mm, and they affect the same areas. The female lives one month and lays 5-20 eggs per day that hatch after a week. Young lice reach sexual maturity within a week. **Lice** prick the skin and suck the blood provoking itch, scratches, erythematous and spot lesions and itch also the neck and the shoulders;
- **pediculosis of the body** caused by *Pediculus humanus corporis* is a white insect that lives in underwear where it lays its eggs and then moves to the skin to eat. It is spread among children on the torso. Symptoms are: itch, erythematous-papules lesions at the armpits, back and buttocks;
- **pediculosis of the pubes**, also called phthiriasis, is caused by a louse called **pubic louse** (*Pediculus pubis*). Transmission is through sexual intercourse or underwear exchange. The pubic louse is dark coloured and sedentary, it settles at the bases of pubic hair and stings, inducing itch. This louse can also be found in the armpits, eyebrows and eyelashes.

Appropriate lotions are sold in order to wash at high temperature (at least 60°C) every garment, especially underwear.

PYODERMAS (*Staphylococcus aureus* and *Streptococcus pyogenes*):

- group of diseases able to produce **toxins**;
- **staphylococci** have a trophism for **pilosebaceous follicles** (folliculitis and spots) while **streptococci** settle **in the skin structures** (i.e. impetigo, erysipelas);
- pyogens produce toxins responsible for the damage to the cell. Under normal conditions, an intact skin does not lead to the disease but they become pathogen agents after: trauma, general and local defence weakening, maceration of the outermost layer of the skin (stratum corneum).

TETANUS:

- causing agents: *Clostridium tetani*;
- common hosts are the digestive tract of **herbivores (horses and sheep)** and

spore spreading occurs through excrements;

- **spores** are **in the soil, water and atmospheric dust of streets, houses, hospitals**;
- the disease does not give a definitive immunity, perhaps for the scarcity of the toxin in circulation;
- the spore penetration takes place through skin and mucosae lesions;
- is transmitted through introducing spores into the wound. A non-sterile needle puncture can theoretically introduce the spores, even if the wounds at greatest risk are those with torn skin, and earth or dirt;
- **the spore needs anaerobiosis condition (lack of air) in order to germinate and give cause the dangerous toxin**, therefore to the subject who has not been vaccinated for a long time **disinfection with hydrogen peroxide is recommended in order to develop oxygen** (see chapter 6 ENVIRONMENT HYGIENE, paragraph products, in “disinfectants”, among the “chemical means of disinfection”);
- **operators** are advised to **respect compulsory vaccinations** to maintain immunity, remembering to do the **decennial calls**.

IMMUNOPROPHYLAXIS

Immunoprophylaxis stands for a package of measures aimed at strengthening subjects who are vulnerable to infection, defined as **immunity**.



Immunoprphylaxis can be:

- **active** (preventive vaccine) if it creates **antigens** through effective and safe **vaccines**. It is able to stimulate our immune system to produce **antibodies** that will protect us against infectious diseases. Vaccines are a **preventive treatment**;
- **passive** (seroprophylaxis) **through antibodies** already developed by other people (donors) or by animals (cattle and horses) if it creates effective and safe **immunoglobulins** (blood products) able to protect us for a short time against infectious diseases. Immunoglobulins are an **emergency treatment**.

VACCINES

I will focus on the preventive vaccines, since who works in our field (as beautician, tattooist, piercer) must know them to assess risks associated with vaccination.

What is a vaccine

A **vaccine** is a biological preparation that contains the micro-organism or its appropriately modified parts (**antigens**) by **injecting** an immune response (**active immunity state**) in the host without causing the disease.

Vaccines can be made up by the following **preparations: micro-organisms, toxins, viral or bacterial modified constituents** so that their injection generates the immunity avoid the onset of the disease.

There are:

1. **vaccines prepared with lifeless micro-organisms destroyed by:**
 - › heat, or chemicals (formaldehyde or beta-propiolactone);
2. **vaccines prepared with live, attenuate micro-organisms:**
 - › cultivated virus or bacterium; a steady and immunogenic mutant, lacking of the virulent content (i.e. living virus but unable to transmit the disease);
3. **toxoid vaccines:**
 - › polysaccharide outer coats: toxoids absorbed with other substances (aluminium phosphate or hydroxide) i.e. chemically deactivated toxins;
 - › chemically extracted (flu split-virus);
4. **vaccines prepared through new technologies:**
 - › for example, vaccine created with the recombinant DNA technique, namely a laboratory reactivated component of the virus used as vaccine.

Vaccine components:

1. active principle;
2. added principle:
 - › thiomersal;
 - › adjuvants: amplify the immune response, support antigens in the development of an early, longlasting and strong immune response;
 - › preservatives (formaldehyde in small quantities);
 - › stabilisers (albumin, gelatine);
 - › antibiotics (kanamycin, neomycin, streptomycin).

How do vaccines work?

Vaccines stimulate our immune system to produce **antibodies** (substances produced by our body to fight diseases) without the onset of the illness.

Vaccines activate the **immune system** to produce right antibodies for the disease, as if the body were really infected. This phenomenon is called **active immunity**. If the vaccinated subject comes into contact with the disease, the immune system will recognize it immediately and will produce the necessary antibodies to fight it.

Babies can be protected from different diseases, such as **measles, parotitis and rubella**, if the mother has previously developed the antibodies for the disease (by contracting it or through vaccination). This is called **passive immunity**. Passive immunity lasts only a few weeks.

How are vaccines created?

First step is modifying the organism (called **pathogen**) which provokes the disease. The pathogen is a virus or a bacterium. Viruses and bacteria can be produced massively in a laboratory through the infection of tissue-culture cells.

The pathogen must therefore be modified not to trigger the disease. This can be done by:

- **weakening**, or “**attenuating**” the pathogen, making it grow repetitively in order to select a less dangerous strain (i.e. MMR vaccine which is among the mild ones);
- **taking** part of the pathogen cause of the immune response and using it in the vaccine;
- **using** the **toxin** that the pathogen prepares and **deactivating it** (vaccine against tetanus);

The pathogen is then combined to other ingredients, such as stabilisers and preservatives, to create a vaccine dose.

Why should you vaccinate:

- vaccines represent the most effective tool against infectious diseases;
- vaccination is a preventive tool to keep good health conditions; also the community will benefit from it and safeguard it. The constitutional principle states that health is a right for the individual and an asset for the community (art. 32 of the Constitution of Republic of Italy);
- vaccination protects the individual and decreases the possibility of diffusion and contagion, this way also subjects who cannot get vaccinated will be protected;
- this phenomenon is called **herd immunity** and has made the eradication of diseases like smallpox possible.

Vaccinations are among the most effective preventive treatments made available through the public healthcare and allow the prevention of serious diseases with debilitating complications or death.

The Italian National Plan for Preventive Vaccination is the reference document for vaccinations in Italy and is constantly updated. It also issues the **vaccination calendar**, where you can find the dates of compulsory and recommended vaccinations, from birth to adult age.

There are vaccinations recommended to people belonging to groups at risk.

Medical staff, who work in constant contact with potentially infected patients and materials, **are at risk** of preventable **infectious disease**, and should **get vaccinated**. An adequate immunisation of medical staff is fundamental to prevent and avoid infections.

For further information on each vaccination, I suggest you to ask for explanations to your GP or in local vaccination.

Chapter 3

CONTAMINATION AND INFECTION TRANSMISSION

FACTORS THAT MAY FACILITATE THE TRANSMISSION OF INFECTIONS

The infection transmission may be facilitated by several factors associated to the host or the environment in which they live.

Favouring factors can be:

a) **individuals** who can also be divided into:

- › **biological**: all the conditions leading to a decrease in the defence mechanisms, such as malnutrition and immunodeficiency;
- › **behavioural**: poor personal hygiene, e.g. **infection by unwashed hands**;

b) **environmental**: low social-economic conditions, crowdedness, scarcity of drinkable water, environmental faecal pollution.

The presence of micro-organisms does not mean there is an infection or disease, if the immune system is able to neutralise and/or destroy the foreign bodies. The dissemination of an infectious agent **depends on many factors**.

The probability of infection-related diseases provoked by a micro-organism depends on:

- **pathogenicity**: ability of a micro-organism to cause a disease inside another organism, with a state of illness. The entity of pathogenicity is expressed by the invasiveness and toxigenicity of the different microbial species;
- **invasiveness**: the set of micro-organism features to penetrate defence barriers and invade the host tissues. Once penetrated, some micro-organisms seem to have a special tropism for some organs or systems (e.g. hepatitis virus), whilst others invade the entire organism (rubella and chickenpox viruses);
- **toxigenicity**: ability of a micro-organism to produce toxins and damage host tissues. There are two different bacterial toxins: endotoxins, freed by

the same bacterium structure after its death, and exotoxins produced and released by the bacterium;

- **virulence**: the aggressiveness of a pathogen shows the level of pathogenicity of different microbial species. It can be assessed through the ability of the micro-organisms to reproduce inside the host;
- **the infecting bacteria load**: the necessary quantity (minimum quantity) of micro-organisms needed to provoke the disease. Even the most virulent microbes need to be a certain number to overcome host barriers and provoke an illness. It varies among species and also among the host immune system;
- **infectivity**: the ability of micro-organisms to colonise a receptive subject, overcoming host superficial barriers, avoiding immune defences, reproducing and generating the disease;
- **risk of contagiousness**: the ability of a micro-organism to spread. We define a contagious disease if the microbial agent emerges on the surface and is transmitted from the ill person or the asymptomatic carrier to the host through direct or indirect contact.

Other important factors are:

- the **availability** of an adequate **means** (vehicle/vector) **of transmission**;
- the **stability** of the micro-organism **in the environment**: the ability of a pathogen to survive for a long time outside the host;
- **the host vulnerability**: the ability of the hosting organism to develop an immune response;
- **the transmission modes** of the organism are: respiratory, digestive, skin or mucosa routes. Diseases can be transmitted also via vectors; mixed transmission also is possible.

CHAIN OF INFECTION

The **infectious disease** results from different interactions of 3 variables:

- micro-organisms;
- environment;
- host.

Pathogens spread from and to people in different ways according to the type.

Modes and times of transmission make up the **chain of infection** or **of epidemiology**.

The **chain of infection** is the process starting with an infective **agent** starting from its **reservoir**, then getting carried through various modes (transmission routes) and finally infecting a new **vulnerable host**.

THE CHAIN OF INFECTIONS:

- **agents: bacteria, fungi, virus, parasites;**
- **source reservoir: man, animal, environment;**
- **transmission routes: skin, mucosa, respiratory system or digestive tract;**
- **vulnerable hosts: man or animal.**

And here we start again!

See Chapter 2: "MICRO-ORGANISMS".

The **source** of the infection may be infected animated means (people and animals) or inanimate means (objects, water, food, environment). The source accommodates pathogens, then it spreads them through various ways and (directly or indirectly) to the host.

The **source** may be:

- **a person who is:**
 - > **ill;**
 - > **carrier;**
 - » **at early stage;**
 - » **healthy;**
 - » **convalescent;**
 - » **temporary;**
 - » **chronic;**
- **animal;**
- **inanimate means (objects or environment).**

Carrier is an asymptomatic individual who hosts an infective agent in his/her own organism, being hence infective. A carrier can be:

- **at an early or latent stage** when the carrier spreads the pathogen during the incubation period (i.e. measles);
- **asymptomatic** when the carrier is infective even if in the "best of health";

- **convalescent** when the carrier continues to eliminate the pathogens even several days, weeks or months after clinical healing. Ill when the carrier keeps on eliminating the micro-organisms even after the clinical healing;
- **temporary** when the carrier state lasts for some weeks;
- **chronic** when the carrier eliminates the pathogen agent for some months or years (e.g. HBV).

The **reservoir** is the natural habitat of infective agents where they live, multiply and what they rely on.

Reservoirs can be: people, animals, environment.

The **host** is a person or animal that can be infected by micro-organisms (bacteria, virus, fungi, parasites).

The host has defence mechanisms:

- barrier 1: skin and mucosae structures, secretions and commensal micro-organisms;
- barrier 2: immune system.

A vulnerable host is somebody exposed to the infective agent.

The transmission from source to host occurs from a contaminated source through a transmission route to a host.

Transmission routes of a pathogen can be classified in:

- **horizontal transmission routes:**
 - › through direct contact (infected, ill or carrier subject and healthy host);
 - › through indirect contact (of vehicles and vectors);
- **vertical transmission routes:** (mother-to-child).

Vertical transmissions can be:

- **inborn**, acquired by the mother and/or by the foetus at any time before birth;
- **perinatal**, acquired when passing the birth canal;
- **postnatal**, acquired during the breastfeeding.

Horizontal transmissions occur:

- **directly** when the microbe goes from the source to the host by direct contact or extreme proximity, without passing through the environment (e.g. sexual-related diseases) or by short air-transmission (e.g. flu);
- **indirectly** or mediated when micro-organisms can survive outside the host

for a relatively long time, usually through vectors or vehicles.

In addition, there are **penetration routes** (portals of entry) into the host organism:

- **through skin or mucosa** (conjunctiva);
- **through respiratory system** (breathing contaminated air, droplets as with the flu, measles, rubella, TB);
- **via faecal-oral routes** (digestive tract: through contaminated water, food, unwashed hands, dirty objects. Examples are typhus fever, cholera, diarrhoea, hepatitis A, polio);
- **through sexual contact** (uro-genital tract: syphilis, gonorrhoea, hepatitis B, AIDS);
- **parenteral routes** (lesions, sticks, blood contact or blood products during injections, transfusions, surgery, traumas).

Micro-organisms have many penetration routes available to the host: **the majority of them penetrate through the mucosae (respiratory, digestive or uro-genital tracts, reproductive system, conjunctiva)**.

Usually the skin is a valid barrier, but can be broken by insect bites, lesions, etc...

Pathogen penetration can occur through:

- small skin lesions;
- wounds, excoriations, burns;
- bites of vectors.

Means of micro-organisms transmission can be:

- **inanimate: vehicle**;
- **animated: (passive or active) vectors**.

We call **vehicles** every inanimate object that can transfer micro-organisms from source to host.

Examples of such **vehicles** are:

- **air**;
- water;
- soil (tetanus);
- dust;
- food (seafood: hepatitis A, eggs: salmonella);
- use consequences (by objects):
 - › **garments, underwear, linen**;
 - › **contaminated waste**.

In **tattoo - piercing - pmu** one needs to consider **contaminated air, garments and waste**.

Infection vectors are living beings (normally arthropods, but not exclusively, also mice) that take, transport and spread micro-organisms outside the host or inject them into a healthy organism (e.g. mosquitos carrying malaria). They can do it actively (mosquito) or passively (fly).

The most dangerous **vector in your field (tattoo - piercing - pmu)** is **MAN** through **HANDS** and **BODY FLUIDS**.

The **elimination routes** (portals of exit) of the source are:

- **skin** (secretions and desquamation);
- **respiratory tract** (oral and nasal: droplets, sneeze, cough);
- **faecal-oral tracts** (faeces);
- **sexual contact** (urogenital: vaginal secretion and semen);
- **blood-borne**.

When applying **tattoos - piercings - pmu** consider the **respiratory, skin and hematic routes**.

IN-DEPTH ANALYSIS OF TRANSMISSION:

Transmission (direct, indirect, horizontal, vertical) occur by:

A. HORIZONTAL TRANSMISSION

- by **DIRECT CONTACT**: (person-person, animal-person, body-body) contact and passage of micro-organisms (lesions during the execution of tattoo - piercing - pmu of the costumer and contaminated hand of the operator, or infected blood of the costumer and skin lesions on the operator hand);
 - › **TRANSCUTANEOUSLY**:
 - Direct injection:
 - » when the pathogen penetrates the organism after an infected animal aggression (e.g. rabies virus enters through animal saliva, or a scratch/bite);
 - » after **accidents** through the traumatic penetration of contaminated materials (tetanus) or through an infected needle injection (for

example: a used needle accidentally scratches the operator).

The pathogen penetration can occur through:

- » small lesions of the skin;
 - » wounds, burns, excoriations;
 - » vector arthropod sting (mosquito - malaria);
 - » traumatic penetration (tetanus);
 - » accidental sticks or cuts (HCV, HBV, HIV).
- » **THROUGH MUCOSA:** the inoculation takes place via direct contact with mucosae (respiratory, digestive, uro-genital tract, reproductive system, conjunctiva).
- » **conjunctival route:** direct contact with the conjunctiva (e.g. contaminated blood squirts in the eye of the operator; protection glasses are highly recommended);
 - » **via respiratory tract: droplets of saliva.** Micro-organisms cannot move through the air independently, but they can be transported by airborne particles like dust, water or respiratory droplets. Droplets are produced by **coughing, sneezing, speaking or during medical procedures. Droplets > 5 micron** containing micro-organisms, are **expelled at short distance through the air in a limited area (1-2 metres)** and due to their weight they tend to settle; **they can deposit on the conjunctiva, mucosa of the nose or of the mouth of the host and colonize it, or on surfaces of the environment**; (e.g. bacterial meningitis by meningococcus, diphtheria, whooping cough, streptococcus and staphylococcus related infections, flu, pneumonia, rubella, viral enteritis, Rotavirus, parotitis, Herpes Simplex);
 - » **via uro-genital routes (reproductive system):** occurs with a real contact between subjects (sexual relation). The most common contact modes are both penetrative and non-penetrative sexual intercourses for the passage of infected blood. The contagion occurs with the direct transmission of infectious agents, released through different secretions directly on the non-infected partner's mucosae (HIV, HBV, genital herpes).
- **INDIRECT CONTACT:** diffusion is made possible by an intermediary (vehicle or vector) which is passively involved in the transmission of the pathogen from the source to the host. The contact occurs when a vulnerable host comes into contact with a contaminated object (tools, needled, garments,

hands) by means of:

- › **VEHICLES: inanimate objects** (air, water, soils, food, dust, devices, tools, equipment such as needles, garments, sheets, towels, blankets, door handles, dirty gloves, contaminated waste) possibly leading to hepatitis A or tetanus;
- › **VECTORS:** usually **animated** (insects, animals); a guest conveying the disease to the host, accommodating the micro-organisms and then spreading them in the environment or directly inside a healthy individual. There are:
 - » **Mechanical vectors:** occasionally and passively play this role. They allow the transfer of micro-organisms from one host to another (flies, lice, mites);
 - » **Biological vectors:** organisms conveying the disease to the host (mosquitos, ticks, lice); these vectors can host the pathogens (e.g. malaria). **Also, poor personal hygiene can be considered a vector.**
- › **RESPIRATORY SYSTEM:** micro-organisms cannot move through the air independently, but they can be transported by airborne particles like dust, water, respiratory droplets. Air is rich in particles transporting germs. In the atmosphere, micro-organisms are present with a relatively low density and submitted to autodepuration mechanisms (sunlight and oxygen, drying). In certain conditions (closed, crowded, humid or heat environments) air can be a real reservoir of germs:
 - » **dissemination of DROPLET NUCLEI:** occurs through the dissemination of **particles < 5 micron** of evaporated droplets containing micro-organisms that hover in the air for a long time **at a distance higher than 2 metres**. They differ from non-evaporated droplets because they remain in the air for up to 14 hours (if no air current) and they can also move and follow air streams from room to room (e.g. with air conditioning) and cover long distances (1-2 metres);
 - » **DUST particles dissemination** containing the pathogen. Droplets of more than 0.1 micron that settle on the ground, get dry and can whirl up again in the air when cleaning in the wrong way. This way, micro-organisms can spread from source to host provoking infections. Possible sources can be: mattresses, sheets and towels, furnishing surfaces. This behaviour may also infect people far from the ill person. Special air ventilation systems are needed for carriers of measles, chickenpox, tuberculosis, flu and SARS;
- › **FAECAL-ORAL ROUTES:** the ingestion of contaminated food or beverages

inducing a gastro-intestinal infection and consequent spreading of the pathogen through faeces. In this kind of infections pathogen is transported through faeces and, in case of poor hygiene conditions, can reach food through so- faecal-oral transmission.

With **indirect transmission** human source diseases follow the **5 Fs** pattern:

- > **Foods;**
- > **Flies;**
- > **Fingers;**
- > **Faeces;**
- > **Fomites.**

I would add 2 more Fs:

- > **Fluids;**
- > **Fornication.**

B. VERTICAL TRANSMISSION

contagion by mother to child through gametes, during/after pregnancy:

- transplacental: infection acquired by the mother and/or the foetus in the prenatal period. infections can be haematogenic, going to the foetus through the placenta passing the vagina, passing through alterations or foetal membrane lesions;
- perinatal (at birth): acquired when passing through the birth canal, contagion with micro-organisms living in the female genital tract;
- postnatal (breastfeeding).

There are **other kinds of transmission** like **zoonosis**.

Zoonosis are a group of **animal diseases that can be occasionally transmitted to humans** by:

- direct contact with pets (e.g. toxoplasmosis, rabies);
- ingestion of contaminated animal products: milk (brucellosis), eggs (salmonella), meat (listeriosis, toxoplasmosis).

Animal species mostly involved are: equines, cattle, sheep, goats, pigs, poultry, birds, rodents, cats, etc.

Infective diseases are always provoked by living organisms.

Contact with a micro-organism can lead to:

- **contamination:** the temporary presence of pathogens on skin, mucosae or environment. Surfaces, liquids or gases can be contaminated and can contaminate each other;
- **infection:** penetration and multiplication of an infectious agent in the host causing a reaction of the organism through the symptoms of a specific disease;
- **colonisation:** a micro-organism growing in a host with no symptoms or damages. A colonised host can be a source of infection. Bacterial colonisation depends on the ability of the pathogen to successfully compete with the microflora of the host so as to acquire nutrients essential for its reproduction. Stages of these process are:
 - › meeting the host;
 - › adhesion to, and colonisation and invasion of the host;
 - › multiplication inside the host;
 - › defending from host immune system;
 - › damaging the host mechanically, chemically and structurally;
- **contagion** is the transmission of an infectious disease of a ill individual or an asymptomatic carrier to a healthy individual.

In the medical field one of the major risks is biological, because it is very difficult to evaluate and monitor. **A biological risk** is the possibility of getting ill after being exposed to potentially infected materials, blood or fluids.

In order to avoid this risk, **personal protective equipment (PPE)** shall be used to protect eyes and respiratory system and the entire body surface.

[\[see Chapter 5: OPERATOR HYGIENE, personal protective equipment - PPE\].](#)

Health care-related infections are associated with the exposition to infectious sources in a medical environment.

They involve:

- medical environment:
 - › patients;
 - › staff;
 - › visitors;
- in the **tattoo - piercing - pmu** field:
 - › **customers**;
 - › **partners**;
 - › **accompaniers**.

Prophylaxes are all the measures aimed at avoiding the onset and diffusion of infections, which can be supported by:

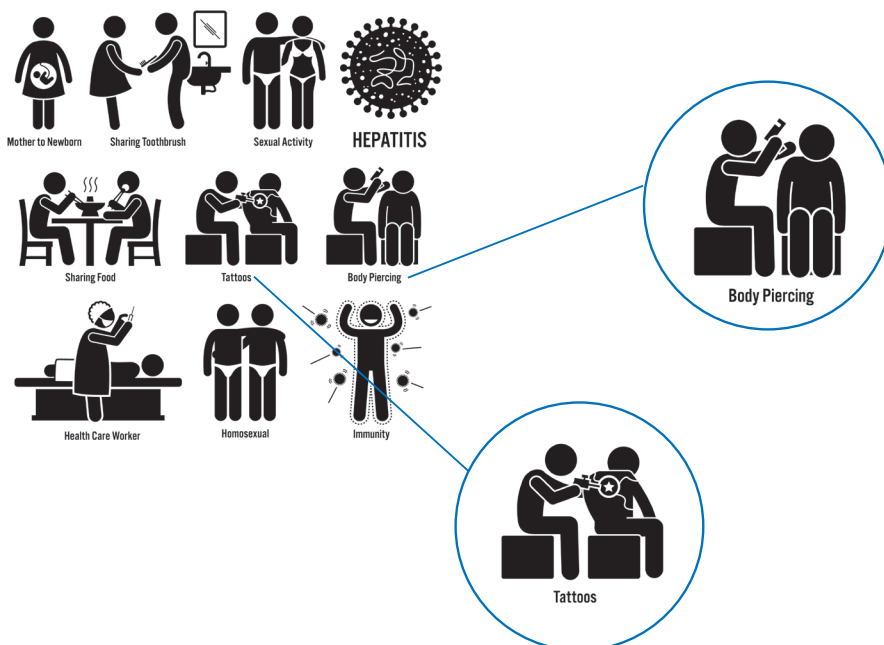
a) **direct methods** aimed at:

- destroying pathogens from the environment (disinfection, sterilisation, disinfestation);
- limiting pathogens diffusion by recognizing them (e.g. epidemiological enquiry, diagnosis);
- strengthening of the immune system of the individual against infections (vaccinations);

b) **indirect methods** aimed to:

- improving individual and collective hygienic conditions by observing **supervision measures** for living and working environments and improving water and food quality.

[see Chapter 2: MICRO-ORGANISMS, *Immunoprophylaxis*].



CONTAMINATIONS IN TATTOO - PIERCING - PMU

Professionals operating in this field work constantly with blood, and so they are permanently exposed to the biological risks.

Infection **transmission** in **tattoo – piercing – pmu execution** may occur between:

- **customer-customer;**
- **customer-operator;**
- **operator-customer.**

Sources of infection of a wound associated with **tattoo – piercing – pmu** can occur by:

- **direct injection:**
 - › during the treatment with:
 - » **skin bacterial flora of the customer** (poor disinfection);
 - » **contaminated tools** (use single-us and, sterile products only);
 - » **contaminated environment;**
 - › during the post-treatment stage through:
 - » **contact with contaminated objects or materials** (unwashed hands, creams, make-up, sweat, towels, pillow-cases and sheets, clothes, pets).

Contaminations can occur by:

- **direct contaminations**, due to **direct contact** with the micro-organisms. In the tattoo – piercing – pmu field, the operator can be infected if he/she has a wound and touches the customer's blood. He/she may also convey the micro-organism from a customer to another if he/she uses the same needles (highly prohibited);
- **indirect contaminations**, caused by **the passage** of micro-organisms **vehicles** (garments, contaminated waste) **or vectors** (hands or body fluids). If the operator contaminates an object by touching it with a dirty glove (e.g. door handle), anyone touching it may be contaminated in turn;
- **cross contamination** happens **through contact** among dangerous pathogens and **different objects**. People touching a contaminated handle and touching also other objects can convey pathogens. It is a chain reaction!

This handbook is about **indirect and cross contamination** given that **micro-organisms are indirectly spread**. I want to make you understand what may happen in your studio while you are working, so as to avoid contamination!

Your customer and your own health will depend on this.

To **prevent** cross contaminations, **you must use personal protective equipment (PPE)**.

To avoid contaminations in your tattoo – piercing – pmu studio you must:

- protect yourself and your customer with PPE;
- use single-use materials (needles, tips, hygienic modules, ink cartridges, machine protections, cables, handle, razors);
- do not touch anything but the working area;
- be careful to what you do and touch;
- follow the right assembly/disassembly working procedures;
- be aware of equipment, surface and environment decontamination and sterilisation procedures;
- carefully handle hazardous high infectious risk waste in compliance with rules and regulations;
- adequately train your staff;
- ventilate your studio between one customer and another;
- keep your studio aseptic.

Danger of cross contaminations can happen:

- **blood or other pathogen sources are not always visible;**
- sometimes we tend to underestimate the danger of working **with no protections;**
- others **who use protection may do so in the wrong way** and **contaminate** (e.g. surfaces which are not cleaned later);
- often who works **believes it is not necessary to decontaminate**, and to have everything under control, but just a small distraction of a **customer, a staff member or yourself** can compromise hygiene;
- in beauty centres, many people work and interact, often ignoring **the overall situation** and so involuntarily contaminate;
- **everybody must know the concept of cross contamination! The is a real risk!** Unfortunately, it is still a widespread reality.

During the execution of tattoo – piercing – pmu **it is difficult not to contaminate. It is fundamental to know the moment in which this is occurring, in order to intervene and decontaminate.**

When the operator does not realise he is contaminating or, even worse, ignores the fact and does not decontaminate, you need to consider your entire studio contaminated.



Remember the example of the door: you are not the only one opening it.

Cross contaminations are difficult to manage, especially when you are at the beginning and you are working in uncomfortable or even disorganized workplaces.

Do not worry, it is like driving: at the beginning, you struggle to remember ignition, clutch, gearshift, brake, rear-view mirror and you think you are going crazy, but then with practice you feel amazed about how many things you are able to do without thinking about it. This is my mission.

You need to think **carefully about every single movement** during the entire procedure of executing **tattoo - piercing - pmu**: you should become one with the studio, the equipment and the customer and always work safely.