



# INFUSION PUMP EXAMPLE

PhD student Licia Di Pietro

[licia.dipietro@ing.unipi.it](mailto:licia.dipietro@ing.unipi.it)



UNIVERSITÀ DI PISA

# WHAT IS THE INFUSION PUMP?

- ✓ Infusion Pump is Bio-medical Device which is capable of delivering fluid in **large or small** amounts and use to deliver nutrients or medications to a patients body in a controlled manner .
- ✓ Some Infusion Pumps are designed **mainly for stationary use** at the Patients bedside. Others, called **ambulatory Infusion Pumps**, are designed to be portable or wearable



# STATIONARY INFUSION PUMPS



# PORTABLE INFUSION PUMPS



# AMBULATORY INFUSION PUMPS

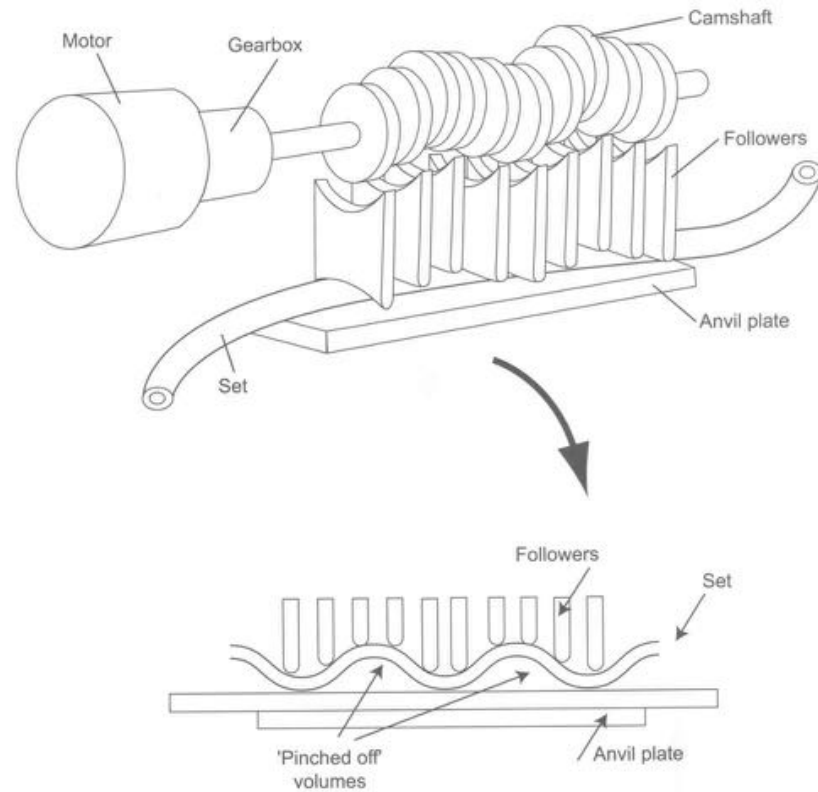


# TYPES OF PUMP

- ✓ Volumetric Pump
- ✓ Syringe Pump
- ✓ Insulin Pump
- ✓ Enteral Pump
- ✓ PCAPump
- ✓ Elastomeric Pump
- ✓ Peristaltic Pump
- ✓ Multi-channel Pump
- ✓ SmartPump



# VOLUMETRIC PUMPS



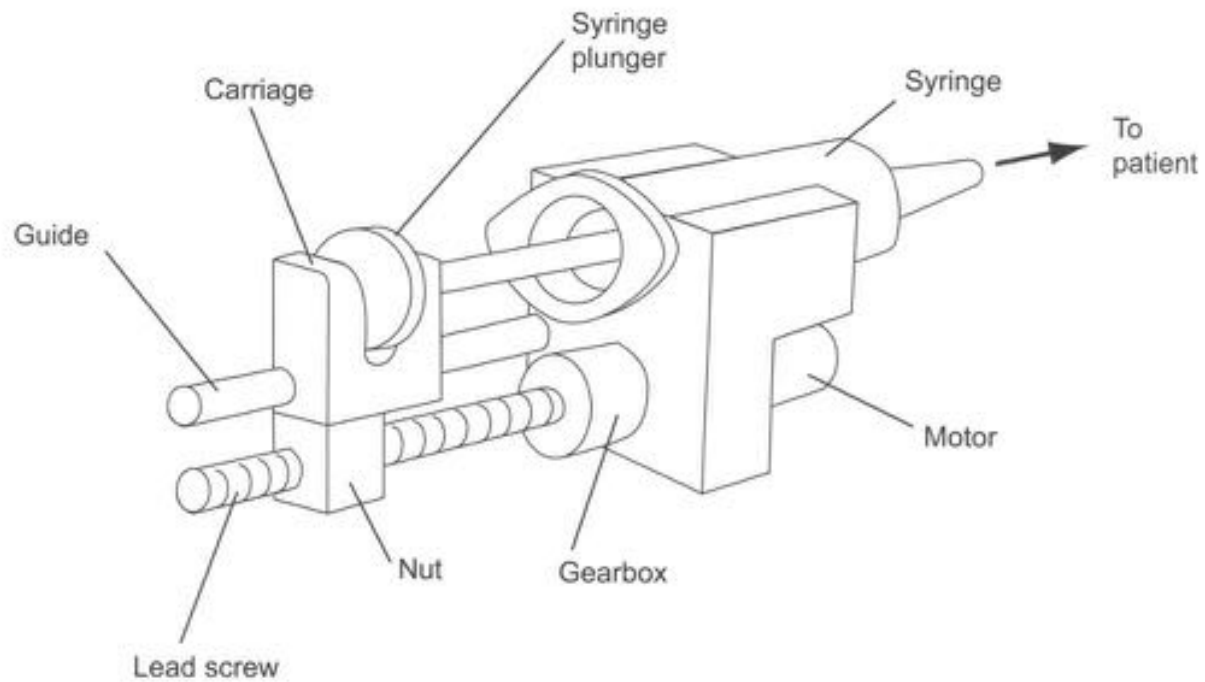
# VOLUMETRIC PUMPS

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- ✓ Preferred for medium and high flow rates and large volumes
- ✓ Generally not suitable for rates  $< 5\text{ml/h}$
- ✓ Variable short term accuracy
- ✓ Alarms: Latch/door open, set out, occlusion, battery low, air-in-line
- ✓ Specialised volumetric pumps for ambulatory use, epidural infusion etc



# SYRINGE PUMP



# SYRINGE PUMP

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- ✓ Generally used for low volume, low flow rate infusions
- ✓ Good short term accuracy
- ✓ Long start up time at low flow rates
- ✓ Alarms: END/near end infusion; drive disengaged, occlusion, battery low
- ✓ Specialised syringe pumps for ambulatory use, PCA, sedation, insulin etc

# INSULIN PUMPS



# PCA (PATIENT CONTROLLED ANALGESIA) PUMPS



# MULTICHANNEL SYRINGE PUMPS



# IMPORTANCE AND PROBLEMS

✓ Where are they used ?

Everywhere

✓ Who are they used by ?

Everyone

✓ And yet...People die



# WHAT GOES WRONG?

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## Medical errors

- ✓ Prescription
- ✓ Preparation of infusion solution
- ✓ Calculation of rate of infusion
- ✓ Setting up infusion pump/unfamiliarity

# SPOT THE DIFFERENCE



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<b>Name:</b>	<b>MS16a</b>
<b>Colour:</b>	<b>BLUE</b>
<b>Rate Settings:</b>	<b>1-99 mm/HOUR</b>
<b>Indicator light flash:</b>	<b>1 second</b>
<b>Boost facility:</b>	<b>No</b>

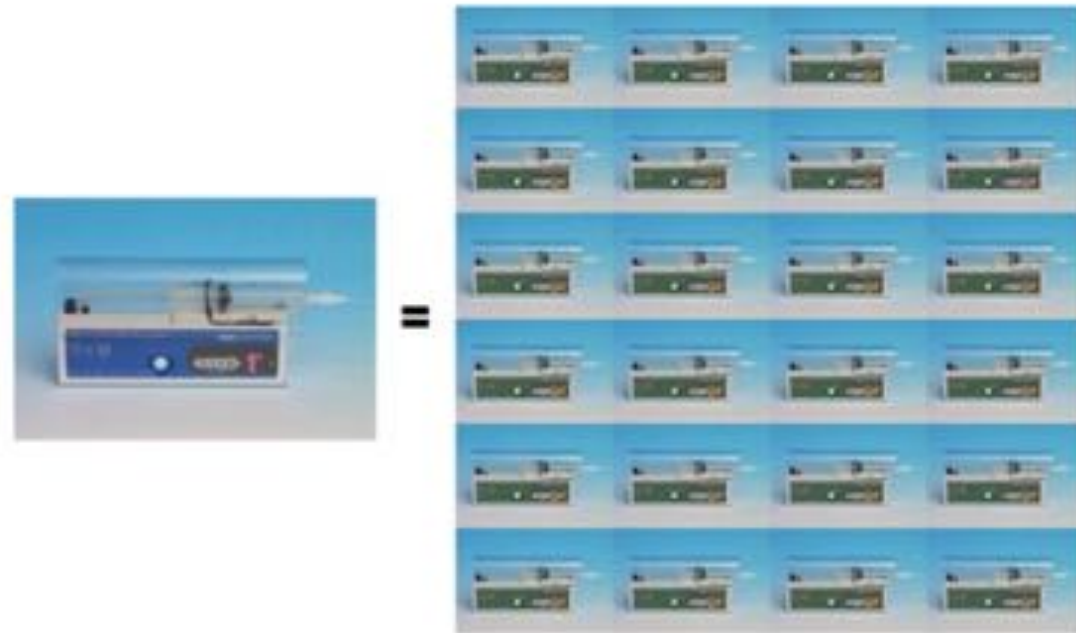
<b>Name:</b>	<b>MS26</b>
<b>Colour:</b>	<b>GREEN</b>
<b>Rate Settings:</b>	<b>1-99 mm/DAY</b>
<b>Indicator light flash:</b>	<b>26 seconds</b>
<b>Boost facility:</b>	<b>Yes</b>

These pumps are currently used to administer concentrated lethal drugs such as morphine. For both pumps the rate is set in millimeters of syringe movement rather than milliliters of fluid.



# SPOT THE DIFFERENCE

If you accidentally use a **BLUE** 1hr pump instead of a **GREEN** 24 hour pump, you will deliver the drug at 24 times the intended rate.





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