



HOW TO DESTIGMATIZE PEDIATRIC MEDICAL DEVICES



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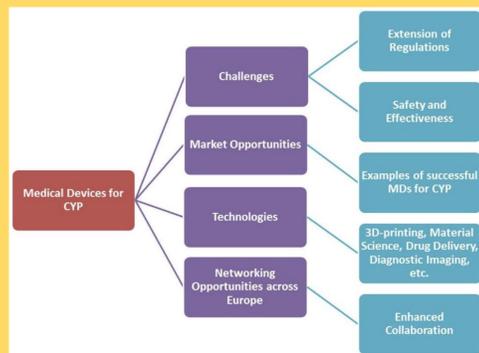
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INTRODUCTION

Physician Abraham Jacobi, considered by most to be the founder of modern pediatrics, offered the first medical lectures on the diseases of childhood in 1860. It is extremely difficult to carry out pediatric research because of limited demographic information. "Pediatric is not just a mini version of adult samples".

One problem that we need to consider is that technology moves extremely fast. I have conducted a research about Nebulizer, and found some ways that it could improved. However, I ended up concluding this research pathway because the market and the people that are still using nebulizers are getting smaller as the device is being replaced by space inhalers which is more convenient.

The main problem that I wanted to solve is the **SOCIAL STIGMA** that a child with a chronic illness faces while using a pediatric medical device among his or her peers.



SECOND DATA COLLECTION & ANALYSIS:

	Vial & Syringes	Insulin Pens	Insulin Pumps:
Affordability	3	2	1
Safety	1	2	3
Ease of Use	1	2	3
Social Acceptance	1	2	3
Total Points:	6	8	10

- My most interested topic was **diabetes** because of lack of exercise and consuming too much high sugar and oil food products. More children are getting diabetes nowadays at a younger age.
- Research on the PROS and CONS of each diabetic medical device.
- Combining with my interest topic and the medical device that could improve social stigma the most, I chose to improve **Insulin Pens** by making a cartoon character casing over it.

Vial & Syringes	Insulin Pumps:	Insulin Pens:
PROS ✓ • Cheapest method	PROS ✓ • They most closely mimic the body's normal release of insulin. • They deliver insulin more accurately than multiple injections. • They result in fewer large swings in blood glucose levels. • They allow you to be more flexible about when and what you eat.	PROS ✓ • They tend to hurt less than syringes. • The pen is already prefilled; no need to draw insulin using a needle. • They're ready to use and easy to carry. • It's easier to set the right dose.
CONS ✗ • Injections can be painful and difficult for people who are afraid of needles. • The injection site must be rotated frequently. • This method comes with a higher risk of hypoglycemic episodes (very low blood sugar). • You'll need to carry around the vials and syringes. • The equipment can be difficult to read and insulin difficult to measure for people with vision or dexterity problems.	CONS ✗ • They're not always covered by insurance. If an insurance policy does cover a pump, it usually has strict guidelines before the insurance company will pay for it. • Pumps may cause diabetic ketoacidosis if your catheter comes out accidentally. • They're more expensive than other options. • There's a risk of infection at the site where the catheter goes into your skin. • You may require a hospital stay for training.	CONS ✗ • They're usually <u>more expensive</u> than insulin in a vial. • Some insulin is wasted if the device has to be "primed" before injecting. • They can't be used for all insulin types. • They only contain one type of insulin. You'll need two injections if you're using two types of insulin. • Pens aren't always covered by insurance. • The needles are an additional cost. • Recommended for children that is above 6 years old

- 1: A case with decoration of children favourite cartoon characters will make them feel less afraid of using a insulin pen. => **No Fear**
- 2: The users will be included more in school=> **Social Acceptance**
- 3: A Insulin pen casing outside can protect the insulin pen greatly=> **Ease of Use**

3D Design:

The Character that is above the case is **BLUEY**. It is a popular cartoon character today. *Bluey* has an important message which is to emphasizes the importance of communication, empathy, and problem-solving within the family. Therefore, I think Bluey will be a successful ambassador for my topic that correlates with my design philosophy. I will to help children to get rid of social stigma. By using a famous character will allow children that are using a insulin pen can be accepted into the group.

ACKNOWLEDGEMENTS / REFERENCES

***Special thanks to Tiffani Ghere for helping make this project possible.

Works Cited:



RESEARCH METHODOLOGIES

- **Researching the most common used pediatric medical device in my School District:** I began trying to collect data from high school students. However, it is not directly related to pediatric device that mainly focus children between the ages of 6-12. I tried to contact the PTA's of the two elementary and one middle school in my district to distribute a survey to K-6 parents. However, only Top of the World Elementary parents completed the survey.
- **Upgrading a medical device that children use frequently:** Researched different commonly used devices surrounding asthma and Diabetes.
- **Research most popular children cartoons** to incorporate into a design.



CONCLUSIONS, IMPLICATIONS, AND NEXT STEPS

- **Size and length of insulin pen**
- **Needle Size:** 4-12.7mm (4mm most common)
- **Plastic Case:** 6.1-6.7in (depends to manufacture)

My prototype of my **Bluey** will be adjustable case (telescoping or modular) or a single size that serves the most customer



FIRST DATA COLLECTION:

- Of the surveys distributed by the PTA's, there were only 5 responses, not enough data collected ✗

★ SURVEY RESULTS ★

- **Common pediatric device used in school:** Inhaler, insulin pump, blood glucose sensor
- **Moments when students feel left out:** Our community are more privileged. Therefore, we provide disadvantaged students a lot of attention and assistance. However, sometimes it's limiting activities when you can't go in the water with your device or can't do a sleepover; it's embarrassing when your device makes noise in class
- **Do you feel our generation know enough pediatric device knowledge?**
 1 person responded 1 out of 5
 3 people responded 3 out of 5
 1 person responded 4 out of 5.

Through this research:

- I learned that pediatric devices are really difficult to design because of limited demographics and many uncontrollable situations: allergies, parents' preferences, etc.
- I concentrated my research on **Diabetes** and **Asthma** medical situations and choose on Diabetes because of state of the US food industry and the rapid increases in type 2 diabetes for the past 40 years for young people.
- I wish to start help children to recover bit by bit from diabetes by using insulin pen.
- Insulin pen will be designed that **reduces fear, social stigma, and increases ease of use.**
- Effective use of insulin pen and healthy diet help children to be diabetic remission.