Formal education of future food handlers
Capacity to handle food safety issues

Andrej Ovca, Mojca Jevšnik, Peter Raspors
Professional food handlers

European Food Safety Agency (EFSA, 2016):

- Contaminated raw material (42.2 %)
- Inadequate cold or hot chain (32.7 %)
- Infected person (18.1 %)
- Cross-contamination (10.1 %)

Nørrung in Buncic, 2008
Todd et al., 2010

- Infected person
- Improper hand washing
- Ignoring hand washing
- Inadequate cleaning of equipment and utensils that come in contact with food

The most common causes leading to a foodborne outbreak
Our motivation:

THE FOOD HANDLER AS A RISK FACTOR FOR FOOD SAFETY

Insufficiently educated, trained, motivated or satisfied person

Future professional food handler close to the end of his/her formal education. (vocational level)
Homo sapiens **ALIMENTARIUS**

1799
First Cookbook in Slovenian language

explanations of individual cooking procedures, description of food properties and instructions for use of foodstuffs, as well as various other instructions for working in the kitchen (hygiene in the kitchen, health, kitchenware, etc.).
"Does education (elementary and secondary level) provide sufficient qualification of future professional food handlers in the field of food safety?"
Environment in which we studied the target organism

An individual is not an empty container in which you can easily put relevant information that would then enable to establish the right relationship and behavior in accordance with the principles of food safety (Foster in Käferstein, 1985)
Levels of our study

<table>
<thead>
<tr>
<th>Levels of our study</th>
</tr>
</thead>
<tbody>
<tr>
<td>The level of the curriculum <strong>planner</strong></td>
</tr>
<tr>
<td>The level of the curriculum <strong>executor</strong></td>
</tr>
<tr>
<td>The level of the <strong>future professional food handler</strong></td>
</tr>
</tbody>
</table>
Methodology: Combined approach

- Document analysis
- Observation
- Survey
- Focus group discussions
Results

Input

- 88 syllabi analysis
- 1,272 students (elementary level)
- 2,365 students (vocational level)
- 180 teachers (elementary & vocational level)

Output

- 6 original scientific papers
- 1 scientific contribution
- 6 conference contributions
Results


OVCA, JEVŠNIK, RASPOR (2014). Food safety awareness, knowledge and practices among students in Slovenia. *Food Control*, 42


OVCA, JEVŠNIK, JEREB, RASPOR (2016). Effect of educational intervention on young people, targeting microbiological hazards in domestic kitchens. *Food Policy*, 61


OVCA, JEVŠNIK, RASPOR (2018) Food safety practices of future food handlers and their teachers, observed during practical lessons.. *British Food Journal*, 120/3

OVCA, JEVŠNIK, RASPOR (2014). Food safety awareness, knowledge and practices among students in Slovenia. *Food Control*, 42

Knowledge deficit

OVCA, JEVŠNIK, KAVČIČ, RASPOR (2018) Food safety knowledge and attitudes among future professional food handlers. Food Control, 84

Susceptibility towards food related risk

High perceived risk severity

Low perceived vulnerability

Over-confident and under-competent
(Majowicz in sod., 2017)

OVCA, JEVIŠNIK, RASPOR (2014). Food safety awareness, knowledge and practices among students in Slovenia. *Food Control, 42*

OVCA, JEVIŠNIK, KAVČIČ, RASPOR (2018) Food safety knowledge and attitudes among future professional food handlers. *Food Control, 84*
What are the differences?

Food processing

Good Hygiene Practice (GHP)

Catering


OVCA, JEVŠNIK, RASPOR (2018) Food safety practices of future food handlers and their teachers, observed during practical lessons. *British Food Journal, 120/3*
Focus Group Discussions

**Food safety**
- **Food properties** (Biological risk > Chemical risk > Physical risk)
- **Technology** (Storage conditions and Heat treatment)
- **Good Hygiene Practices** (Handwashing and clothing)

**Responsibility**
- **As a professional food handler** (Sanction-sensitive and health-sensitive)
- **As a consumer** (Rarely discussed / shared responsibility not included)
- **As a link in food supply chain** (Early links of FSC to be more responsible)

**Barriers**
- **Working environment** (Time, number of people, organization of work etc.)
- **Personal** – attitude (A fallacy of assuring food safety / high self-confidence)
- **Personal** (Habits, lack of concentration)

**Influence of others**
- **Parents** (Hygiene related / as a disruptive factor - negative connotation)
- **Teacher in the school** (Perceived as authority figures and role models)
- **Instructor in the food enterprise** (Perceived as authority figures and role models)
Future professionals’ food preparation behaviour

Fulfilment of hygiene requirements for food handlers in contact with food by observed groups of students.

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Total compliance</th>
<th>Profession specific compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Catering</td>
</tr>
<tr>
<td>Working clothes</td>
<td>12/12</td>
<td>6/6</td>
</tr>
<tr>
<td>Health symptoms</td>
<td>11/12</td>
<td>5/6</td>
</tr>
<tr>
<td>Head-coverings</td>
<td>10/12</td>
<td>4/6</td>
</tr>
<tr>
<td>Artificial nails/nail length</td>
<td>9/12</td>
<td>4/6</td>
</tr>
<tr>
<td>Chewing and eating</td>
<td>4/12</td>
<td>1/6</td>
</tr>
<tr>
<td>Visible jewellery</td>
<td>2/12</td>
<td>0/6</td>
</tr>
</tbody>
</table>
Future professionals’ food preparation behaviour

Total and profession-specific compliance (%) of the observed elements of production process with predefined observation criteria.

<table>
<thead>
<tr>
<th>Observation criteria</th>
<th>Total compliance</th>
<th>Professional area</th>
<th>Catering</th>
<th>Food processing</th>
<th>p value</th>
<th>Chi square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>n2</td>
<td>Compliance n3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand washing</td>
<td>32.6</td>
<td>24.4</td>
<td>139</td>
<td>40.3</td>
<td>.006</td>
<td>7.722</td>
</tr>
<tr>
<td>Cleaning</td>
<td>71.7</td>
<td>71.3</td>
<td>83</td>
<td>72.2</td>
<td>.890</td>
<td>0.022</td>
</tr>
<tr>
<td>Cross-contamination</td>
<td>73.5</td>
<td>57.0</td>
<td>77</td>
<td>93.5</td>
<td>.000</td>
<td>28.860</td>
</tr>
<tr>
<td>Traceability</td>
<td>60.5</td>
<td>15.8</td>
<td>24</td>
<td>95.8</td>
<td>.000</td>
<td>28.423</td>
</tr>
<tr>
<td>Handling waste</td>
<td>95.2</td>
<td>90.9</td>
<td>20</td>
<td>100.0</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Handling raw material</td>
<td>92.2</td>
<td>90.1</td>
<td>3</td>
<td>100.0</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Temperature control</td>
<td>95.7</td>
<td>88.5</td>
<td>15</td>
<td>100.0</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

n₁ – total number of observed events; n₂ – number of observed events among catering students; n₃ – number of observed events among food-processing students
Interconnected events leading to the incorrect practices

1. **Ventilation system**
2. **Opening windows**
3. **No insect-proof screens**
4. **Cooling of Prepared Food**

5. **The teacher instructs the student to wash his hands**
6. **Inadequately equipped washbasin**
7. **The student performs the task, but does not warn the teacher**
Main conclusion:

Once formal education is completed, on-going training that focuses only on improving knowledge may not assist in overcoming barriers identified with this study.
An example of innovative training approach in catering industry in Slovenia
8. epizoda: Prav kuhna
Seš Sale razlazi, kako dvostopenjsko
ohlajamo

PRAV KUHNA

slorest

LEP POIZDAV GEŠ ŠE
GALI, VODJA CEBRA

V PRAVNAHLI BLO GA QA KUHARNI
POŽOBIK ŽOK SRET POLOMLI!

ŽOKI JE VIDEL, DA BORSTI POLOMLIENI
MEHAN. BURE IN PAŠNJ.

HUDO POLOMLI!

KARIER'IJE JE TEH SI UŽITR PAŽNJ. POZBAH,-
BI TO奠TO, NJUNO NARENJ SEMNASI TANKO;
BI TO POLOMLENI NEKAJ.

MŘENJA

ZALEZBNIK PAŽNJ SPLOH NE SPOMN.
BI TO MODERL NAKREŠE,
NARJEŠE NA ŽADNOKO
POŽOBIK ŽOKA KI JE BILA SOBZVANJE,
DA N B RAZDJEAL PAŽNJ. NAJ
JE NA VETRO
POŠTOMI, KORISTI

KAJ!?

V KOMNINJI, KER MODRAN ŠOK KORNJE,
ŠE VIDNO, OOHAJNA DVOSTOPENJSKO,
PRI OHHAJNAJ SI PKRAGOMI S
HUIDNJEM TELU ALI PRIMOVI. ZAHIS
UPRAĐAJE PLASTIKE, NAPOLENJE Z
VODA, KO JAH ZAKRAJNO ENI HAMAJE V
ZAKRAJNJEM.

KAKO PRAVILNO DVOOSTOPEJSKO OHLAJAMO?

ČE ŠDATE V
KOMNINJSKI ŠOK,
KOMNINJE, O
OHHAJNAJ

2. STOPNJA

14130

PONOZI DAIAN V HUIDNJEM.

1. STOPNJA

8130

PARNI RAZDALNO NA MAJHNE
KOMNINJE IN A OBTREN
POZBOMI V NUDNO VODA.

V VODA SODEM HUIDNJEM TELA.
VODA HIZA TAKO = 1°C, IN DOBRE
VAKS NAJLHLET POHJABO.

NAGRADNO VPRAŠANJE

Preberite strip. S edelavce se se pogovorite in ugotovite,
kažne napake sta tokrat naredila Zoki in Marička.
Kako bi morala pravilno ravnati?
IF... ABCDEFGHIJKLMNOPQRSTUVWXYZ
EQUALS...
1234567891011121314151617181920212223242526
THEN...
KNOWLEDGE
11+14+15+23+12+5+4+7+5 = 96%
HARDWORK
8+1+18+4+23+15+18+11 = 98%
Both are important, but fall just short of 100%
BUT ATTITUDE
1*20+20+9+20+21+4+5 = 100%

Creating a Culture of Food Safety