Using Drupal to create a digital patient education experience at Memorial Sloan Kettering Cancer Center (MSK)

Kermitt Ramirez
Jacob Rockowitz

www.mskcc.org/pe
About Us

Kermitt Ramirez
@silentkerm
– Web Specialist for the Department of Patient and Caregiver Engagement at MSK
– MSK employee since 2007

Jacob Rockowitz (Big Blue House)
@jrockowitz
– Drupal developer and software architect
– Maintainer for the Drupal 8 Webform module
– Consultant for MSK since 1999
Today’s Session

**Goals**

Provide a history of MSK’s transition from analog educational resources to dynamically generated, multilingual PDFs.

Explore various technologies used and methods applied to create a digital patient education experience for patients and caregivers and an admin UI/UX for health education content editors.
History
At MSK, the Department of Patient and Caregiver Engagement is dedicated to communicating and engaging with cancer patients, their caregivers, and the public.

Our Patient and Caregiver Education Program collaborates with healthcare professionals to provide accurate, clear, and reliable educational resources to the global community.
Patient and Caregiver Education

“Fact cards” and DVDs for patients and caregivers were made available to order and distributed by clinicians.
History

Patient and Caregiver Education

Goal was to make all of our resources available online
Patient and Caregiver Education

Partnered with Jacob Rockowitz for development of the Inettool. A homegrown content management system (CMS) developed using ASP/Jscript and used to upload and manage a library of PDFs.
Patient and Caregiver Education

We are online...

Patient Education Publications

Browse By Category: Select a Cancer Type

Search by Keyword: Exercises Breast

Results 1 - 10 of about 102 for Exercises Breast.

[PDF] Exercises After Breast Surgery
Self-Care and Follow-Up

... Exercises After Breast Surgery ... You will need two pieces of tape for this exercise. ... If you have had surgery on both breasts, set your goal using the arm that ...


[PDF] Breast Reconstruction Using Tissue Transfer: A Guide to Care After Surgery
Self-Care and Follow-up
Patient and Caregiver Education

But only PDFs were available online…
History

Patient and Caregiver Education

Video resources
History

Patient and Caregiver Education

Translations
History

Patient and Caregiver Education

Improve Search
Patient and Caregiver Education

Send resources to patients and caregivers electronically
History

Drupal 6

- Admin UI
- Taxonomy/Categorization
- Drupal Search
- HTML to PDF
- Translations
- Revisioning
- Rich media support
**Stress Echocardiogram**

**Introduction**

An echocardiogram, or “echo,” is a test that tells your doctor about the structure and function of your heart. Heart valves keep the blood flowing through the heart and to the lungs. An echo tells us:

- How well your heart valves are working.
- How well your heart muscle is moving.
- How your blood is flowing.
- The size of the four chambers of your heart.

This test can also provide information about the coronary arteries. These are the blood vessels that often become narrow because of high cholesterol.

Any abnormalities in the heart’s structure or function may cause symptoms. They include shortness of breath, chest pain, or both. These symptoms can also be caused by other conditions. An echo can help your doctor diagnose their cause.

**Preparation for a Stress Echo**
Drupal 6
Medication leaflets synced to our site nightly via FTP
Green Initiative

Reduce quantity of print resources in circulation

- Resources with low print distribution were made available via web-only
- All new resources to have an HTML version
Patient and Caregiver Education
Drupal 6

Developed print stylesheet for PDFs generated from HTML
• Matched “fact card” layout created by our Graphics team
History

Drupal 6

Send to patient functionality introduced
Drupal 6
As we were migrating from a Drupal 6 site, our Communications team opted to move to Drupal 8 in alpha versus upgrading to Drupal 7 for the long-term benefits of being on the latest platform.
Migration
Migration

Drupal 8

Converting all static PDFs to HTML

Involved converting .indd files to HTML and importing to CMS as nodes in Drupal for cleanup by content editors
Aggregation
Aggregation

Drupal 8

Expanded content types

- Text
- External Text
- Videos
- External Videos
- About Herbs
- Adult Medications (Lexicomp)
- Pediatric Medications (Lexicomp)
- Presentations
- Webcasts
- Online Support Groups
Drupal 8

- Admin UI
- Revisioning
- Translations
- Search
- Improved PDF generation
Implementation

Drupal 8

Admin UI (Views)
Implementation

Drupal 8

Admin UI (Views)

Patient Education Resources

Manage | Duplicates | Snippets

+ Add Patient Education

Total: 4415 Patient Education Resources

**GENERAL**

Type
- Any

Title

Keywords

Published
Yes

Status
- Any

Owner
- Any

Language

English

**EDITORIAL**

Created

Due for Review

Last Updated

Out for Review

Content Expert

**CATEGORIES/TAGS**

**ADVANCED**
Implementación

Drupal 8

Admin UI (Node Edit Form)
Drupal 8

Revisioning (Content Moderation)
### Drupal 8

#### Revisioning

For Adult Patients » Cancer Care » Patient & Caregiver Education

**English revisions for 2-Gram Sodium Diet**

Revisions allow you to track differences between multiple versions of your content, and revert to older versions.

<table>
<thead>
<tr>
<th>REVISION</th>
<th>OPERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/03/2018 - 3:44 PM by Kermit Ramirez</td>
<td></td>
</tr>
</tbody>
</table>
(Published) |
| 05/31/2018 - 1:26 PM by Kermit Ramirez |
(Published) |
| 02/06/2018 - 4:05 PM by Kermit Ramirez |
updating nutrition facts image - 02.06.18 KR (Published) | Revert |

Current revision

Revert
Implementation

Drupal 8

Translations

Lingotek
THE TRANSLATION NETWORK
Implementation

Drupal 8

Lingotek Professional Translations

For Adult Patients > Cancer Care > Patient & Caregiver Education

Translations of 2-Gram Sodium Diet

<table>
<thead>
<tr>
<th>SOURCE &amp; TRANSLATION STATUS CODES</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOURCE</td>
</tr>
<tr>
<td>TARGET</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE</th>
<th>SOURCE</th>
<th>TRANSLATIONS</th>
<th>IMAGE TRANSLATIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Gram Sodium Diet</td>
<td>EN</td>
<td>ES RU</td>
<td>nutrition_facts-fig_1-en.png</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LANGUAGE</th>
<th>TRANSLATION</th>
<th>STATUS</th>
<th>LAST UPDATED</th>
<th>VIEW</th>
<th>OPERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (Original language)</td>
<td>2-Gram Sodium Diet</td>
<td>Published</td>
<td>02/05/2018</td>
<td>Print</td>
<td>PDF</td>
</tr>
<tr>
<td>Russian</td>
<td>Диета с употреблением не более 2 г натрия</td>
<td>Not published</td>
<td>12/03/2018</td>
<td>Print</td>
<td>PDF</td>
</tr>
<tr>
<td>Spanish</td>
<td>Dieta con 2 gramos de sodio</td>
<td>Not published</td>
<td>12/03/2018</td>
<td>Print</td>
<td>PDF</td>
</tr>
</tbody>
</table>

Memorial Sloan Kettering Cancer Center
### Implementation

#### Manage Translations

**SOURCE & TRANSLATION STATUS CODES**

<table>
<thead>
<tr>
<th>Source</th>
<th>Request</th>
<th>Edited</th>
<th>Importing</th>
<th>Current</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>Request</td>
<td>Edited</td>
<td>Pending</td>
<td>Ready</td>
<td>Current</td>
</tr>
</tbody>
</table>

#### FILTER

- **Title**: Filter by Content type
- **Content type**: Patient Education
- **Job ID**: 

#### SHOW ADVANCED OPTIONS

- Filter
- Reset

#### BULK DOCUMENT MANAGEMENT

- Upload source for translation
- Execute
- Show advanced options

Displaying 1 – 10 of 622 documents

<table>
<thead>
<tr>
<th>CONTENT TYPE</th>
<th>TITLE</th>
<th>SOURCE</th>
<th>TRANSLATIONS</th>
<th>TRANSLATED IMAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Education</td>
<td>24-Hour Urine Collection for Total Protein Evaluation</td>
<td>EN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Drupal 8

Instant Search
Patient & Caregiver Education

We invite you to search our virtual library, where you can find written resources, videos, and online programs.

Our Patient & Caregiver Education Program is dedicated to educating and empowering people with cancer, their caregivers, and the public. We know navigating cancer care information can be overwhelming. That's why our Health Education Specialists work with MSK healthcare providers to develop accurate, clear, and reliable educational resources. Learn more about our staff »

We also offer live, online education and support groups through our Virtual Programs. From the comfort of your own home, you can participate in professionally led, confidential, and free interactive programs that allow you to connect with other people with cancer and their caregivers.
Patient & Caregiver Education

We invite you to search our virtual library, where you can find written resources, videos, and online programs.

Search by keyword

1. **Showering While You Have a Central Venous Catheter | Video**
   This video will teach you how to put on a waterproof cover over your dressing before you shower and how to shower using Hibiclens.

2. **How to Flush Your Central Venous Catheter | Video**
   This video will show you how to flush your central venous catheter (CVC).

3. **What to Expect on the Day of Your Surgery at MSK’s Memorial Hospital | Video**
   This video will give you an idea of what to expect when you come to Memorial Hospital (MSK’s main hospital) on the day of your surgery.

4. **How to Manage Constipation During Chemotherapy | Video**
   This video explains why you may have trouble having a bowel movement, which is called constipation, what you can do to prevent it, and when you should call your healthcare provider.

5. **Caring for Your Wound after Your Skin Procedure Without Sutures**

Educational Resources

Log in to print or send this list to your patient and save lists of resources you use frequently.

Add resources to your list by clicking the checkbox next to the title.

Learn how to create and manage your resource lists

Refine Your Search

Types

- Text [4586]
- Video [63]
- Online Support Group [43]
- Webcasts [4]
- Presentation [2]

Languages

- English [4698]
- Spanish [5813]
- Russian [3778]
- Chinese (Cantonese/Mandarin) [48]
- Arabic [32]

Show more

Categories

- Chemotherapy & Medications [3703]
- Surgeries, Tests & Procedures [314]
Drupal and Algolia Search Integration

**InstantSearch APIs (Front-End/JavaScript)**

InstantSearch.js makes it easy to design the perfect search experience using prepackaged search widgets or by creating your own!

[https://community.algolia.com/instantsearch.js](https://community.algolia.com/instantsearch.js)

**Search API Algolia (Back-End/Drupal)**

Provides Drupal Search API integration with the Algolia search engine

[https://www.drupal.org/project/search_api_algolia](https://www.drupal.org/project/search_api_algolia)
PDF Generation Tips

**HTML to PDF conversion**

- Keep it simple
  - Basic markup
  - No custom fonts
- Presentation
  - Page breaks
  - PDF previews
- Performance
  - Caching
  - No JavaScript
PDF Generation Tools

**wkhtmltopdf**
CLI tool for rendering HTML into PDF using the WebKit rendering engine.  
https://wkhtmltopdf.org/

**XPDF**
PDF viewer/toolkit, including a text extractor, and image and HTML converter.  
https://www.xpdfreader.com/

**GhostScript**
An interpreter for the PostScript language and for PDF.  
https://www.ghostscript.com
Implementation

Drupal 8

Drupal PDF Generation Modules

Printer, email and PDF versions for Drupal 8
Generates a printer-friendly version of Drupal content entities.
https://www.drupal.org/project/printable

Entity Print
Allows any Drupal entity to be converted to a PDF
https://www.drupal.org/project/entity_print
Thanks to the improvements to PDF generation, we were able to discontinue printing on card stock.
Implementation

Drupal 8

Accessibility Improvements

**Standard Font PDFs**

**Stress Echocardiogram**

This information explains what a stress echocardiogram is and what to expect during your procedure.

**About Your Stress Echocardiogram**

An echocardiogram, or echo, is a procedure that uses ultrasound to look at the structure and function of your heart. Ultrasound uses sound waves to create pictures.

If your heart’s structure or function isn’t normal, you may be having symptoms such as shortness of breath or chest pain. However, these symptoms can also be caused by other conditions. Your echo can help your doctor diagnose the cause of your symptoms. It can also give your doctor information about your coronary arteries. These are the blood vessels that often become narrow because of high cholesterol.

Your echo lets your doctor know:

- How well your heart valves are working.
- How well your heart muscle is moving.
- How your blood is flowing.
- The size of the 4 chambers of your heart.

**Before Your Procedure**

Ask your doctor which medications you should take before your stress echo. Take only those medications with a sip of water.

If you have diabetes, ask your doctor or diabetes nurse educator how to take your medication and food on the day of your procedure.

**Large Font PDFs**

**Stress Echocardiogram**

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- How well your heart valves are working.
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- The size of the 4 chambers of your heart.
This information explains what you can eat while you’re following a 2-gram sodium diet.

**About a 2-Gram Sodium Diet**

Sodium is a mineral that helps balance fluids in your body. It’s found in almost all foods.

You have been instructed to follow a 2-gram sodium diet. On this diet, you will limit the total amount of sodium you eat or drink to 2 grams, or 2,000 milligrams (mg), daily. One teaspoon of salt contains 2,300 mg of sodium, so you will need to take in less than this amount per day.

This diet can be used to manage:

- Heart disease
- High blood pressure
- Kidney disease
- Poor liver function
- Weight gain from water retention (such as swelling in your legs)

**Understanding Sodium Claims**

The following table includes sodium claims you will find on packaged foods. Although these items may contain less salt than their regular versions, that doesn’t guarantee that they are low in sodium. Knowing what these
Editor

Drupal 8

Code Mirror Module

Adds syntax highlighting for "Source View" in CKEditor WYSIWYG editor using

https://www.drupal.org/project/ckeditor_codemirror
IMCE is an image/file uploader and browser that supports personal directories and quota.

https://www.drupal.org/project/imce
This information explains what you can eat while you’re following a 2-gram sodium diet.

**About a 2-Gram Sodium Diet**

Sodium is a mineral that helps balance fluids in your body. It’s found in many foods and beverages, and the body needs it to function properly. However, too much sodium in your diet can lead to health problems.

You have been instructed to follow a 2-gram sodium diet. On this diet, you eat or drink to 2 grams, or 2,000 milligrams (mg), daily. One tablespoon of salt contains 2,500 mg, so you will need to take in less than this amount per day.

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**Understanding Sodium Claims**

The following table includes sodium claims you will find on packaged foods. Although these items may contain less salt than their regular versions, that doesn’t guarantee that they are low in sodium. Knowing what these claims mean can help you make healthier choices.

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**Editor**

**Drupal 8**

**CK Editor Templates**

https://www.drupal.org/project/wysiwyg_template
Entity Embed

Allows any entity to be embedded within a text area using a WYSIWYG editor.

https://www.drupal.org/project/entity_embed
Distribution
As some clinics may not be equipped to print resources on demand for patients and their caregivers, clinicians can still request certain high demand resources as 8 ½ x 11 printouts.
Distribution

Drupal 8

Educational Resource Request Form
Distribution

Drupal 8

Bookmarking
Patient & Caregiver Education

We invite you to search our virtual library, where you can find written resources, videos, and online programs.

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Distribution

Drupal 8

Print Bundling
Distribution

Drupal 8

MyMSK Patient Portal integration (Send to Patient)
Distribution

Drupal 8

Accelerated Mobile Pages (AMP)
Distribution

Drupal 8

Accelerated Mobile Pages (AMP)

- Google backed project
- Helps pages load faster on mobile devices

2-Gram Sodium Diet

View on MSKCC.org

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This diet can be used to manage:

- Heart disease
Feedback
Feedback

Drupal 8

Feedback Form

Tell Us What You Think

Your feedback will help us improve the information we provide to patients and caregivers.

Provide feedback »

Tell Us What You Think

It was easy to find the information I was looking for.
- Strongly disagree
- Disagree
- Neither
- Agree
- Strongly agree

The information on this website is easy to understand.
- Strongly disagree
- Disagree
- Neither
- Agree
- Strongly agree
Thank You
Visit us at www.mskcc.org/pe
Questions